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Johne's Disease — Environment and Management

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Treatment of Cattle Scabies with Lindane

An Unsuccessful Attempt to Treat Avian Monocytosis with Antibiotics

Treatment of Urinary Calculi

Immune Response of Ferrets to Vaccination with Egg-adapted Distemper Virus

Progesterone to Delay Estrum in Bitches

(Complete Index on Page VIII)

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In This Issue . . .

General Practice . . .

Johne's Disease — Environment and Management: Part I.—W. W. Dimock 443
Swine Brucellosis Control in a Herd with Valuable Blood Lines—Alvin B. Hoerlein and T. S. Leith 448
Prophylactic and Therapeutic Use of Aureomycin in Retained Placenta in Cows—Jack H. Beattie and Joseph D. Leaming 451
Treatment of Cattle Scabies with Lindane—H. E. Kemper and H. O. Peterson 453
An Unsuccesstul Attempt to Treat Avian Monocytosis with Antibiotics—H. E. Adler, C. M. Hamilton and J. S. Carver 456
Treatment of Urinary Calculi—J. E. Prier, R. M. Thomas, and R. G. Bramlet 459
Ancient Chinese Insect Therapy in Human and Veterinary Medicine—Arthur H. Bryan 461

Small Animal Practice . . .

Immune Response of Ferrets to Vaccination with Egg-adapted Distemper Virus—Gracia A. Baker, Robert W. Leader, and John R. Gorham 463
Progesterone to Delay Estrum in Bitches—G. H. Murray and E. W. Eden, Jr. 467
My Professional Responsibility to My Clients—James H. Rosenberger 469

Editorial Comments . . .

Foot-and-mouth Disease Research at Pirbright 447
Military Surgeons to Convene in Washington 447
Psittacosis 455
Avirulent Anthrax Vaccine 460
Milk Sanitation 468
Western Equine Encephalomyelitis 470
"Watch and Report" 471
Inequality of Entrance Rank and Pay for Veterinarians 471
Progress in Vesicular Exanthema Control 471
Practice of Veterinary Medicine 472
Intraperitoneal Injection in Cattle 473
Moss Essay Contest Winner 473
Principles of Animal Health—R. R. Dykstra 475
Public Health—James H. Steele 476
Veterinary Parasitology—A. O. Foster 477
Poultry Practice Problems—W. R. Hinshaw 478

Abstracts of Literature . . .

Bird Transmission of Foot-and-mouth Disease 452
Combined Penicillin and Vaccine Treatment for Swine Erysipelas XXX
Fluorosis in Cattle 479
Toxoplasmosis—An Occupational Disease 479
Experimental Production of Symptoms of Bovine Hyperkeratosis 479
Edema Disease in Swine 479

Clinical Reports . . .

Hormone Treatment of Sows and Boars—G. C. Poppenhouse 450
Torsion of the Stomach in the Dog—King S. Gibson 480
Experience with Scouring Pigs—William J. O'Rourke 482

Book Reviews 484
The Psychology of the Client—Kenneth B. Haas, Sr. and Kenneth B. Haas, Jr. XXII
Coming Meetings XXXVIII
Necrology XXXIX

Johne's Disease: Environment And Management*

PART I — GENERAL CONSIDERATIONS

W. W. DIMOCK,† D.V.M., Lexington, Kentucky

THE control and prevention of a number of infectious transmissible diseases of animals in the United States, on a state-federal cooperative basis, has demonstrated in actual results how effectively such diseases may be suppressed or eradicated. The accomplishments in this field may be designated with pride.

Procedures and methods followed, mainly the test-and-slaughter method, have been sound both in general and in particular cases. In each instance, these procedures were based on a summation and careful analysis of all the pertinent facts known at the time, and could be successfully carried out because of the existence of specific and highly accurate diagnostic methods. When the seriousness and economic importance of diseases like foot-and-mouth, tuberculosis, brucellosis, and others are considered in relation to the livestock industry and the general public welfare, results accomplished have justified both the means employed and the work and money involved in their suppression.

Since the work was done without cost to the owner, paying indemnity for condemned animals tended, materially, to soften the opposition that sometimes developed against the test-and-slaughter method of preventing spread of these diseases.

During the past 50 years, because of the results accomplished and because of the widespread educational programs, the state-federal cooperative program of dealing with a number of diseases became, for all practical purposes, fully accepted as a sound national policy.

Today, however, this acceptance of the test-slaughter-indemnity method of control has come to create an attitude of dependency, of expected paternalism on the part of many a livestock owner. He has come to feel that there is nothing worthwhile he can do to cope with certain affections, such as Johne's disease; that as an individual it is neither his obligation nor to his advantage to make the effort to carry out those procedures in care and management that would assist in control and prevention of Johne's disease in his own herd, and to prevent the infection from becoming widespread.

Research on Johne's disease, especially on johnin, should be continued, but even while this diagnostic agent or a cure remains unperfected, it is unnecessary to experience losses that occur yearly. Certainly, it is not good animal hygiene to permit the increasing spread of this insidious ailment. It is costly and incurable; our problem, therefore, is prevention.

Two diseases of cattle have been mentioned frequently as justifiably coming under state-federal supervision, namely mastitis and Johne's disease. However, both can be effectively controlled by the livestock owner.

Mastitis of dairy cattle can be handled effectively by the use of proper farm dairy-herd and barn hygiene, and by methods of diagnosis and treatment available to veterinary practitioners. State laboratories are now prepared, in most areas, to conduct tests to supplement field tests; and the pasteurization of

*The investigation reported in this paper is in connection with a project of the Kentucky Agricultural Experiment Station and is published by permission of the director.

†Department of Animal Pathology, Kentucky Agricultural Experiment Station, Lexington.

fluid milk has done much to eliminate direct danger from the use of raw fluid milk that might come from udder infections and external contaminations. Mastitis is, therefore, a disease that should be, can be, and is being dealt with by the livestock owner and veterinarian.

Similarly, Johne's disease of cattle (specific infectious bacterial enteritis, paratuberculosis) is one which should and can be dealt with by the livestock owner and his veterinarian. Their combined efforts, if fully and properly carried out, will be surprisingly effective in keeping a noninfected herd free of infection, in checking its spread in a herd where it has occurred, and in preventing further spread to farms and herds now free of the disease.

The Problem of the Disease

It must be remembered that Johne's is not, like tuberculosis and brucellosis of cattle, and glanders of horses, a menace to the public. It is not, like foot-and-mouth disease or tick fever, a serious menace to the total animal numbers of the country. Since it is not a public health problem, the question arises as to the advisability and the legality of paying indemnity for cattle so affected. It must also be remembered, that the johnin so far perfected, when used on early, infected nonclinical cases, has failed to give a clear-cut diagnostic reaction. Based on evidence at present available, it is doubtful if johnin will ever detect early cases.

Therefore, everything considered, if and when diagnostic agents are more reliable, the carrying out of all the details of the procedures necessary to eradicate the disease will still be the responsibility of the livestock owner. In other words, the need for sanitary precautions especially designed for prevention will continue to exist, regardless of diagnostic agents, therapeutic treatments, or government indemnities.

The livestock owner should also begin to realize that these same sanitary measures designed to maintain a herd free of Johne's disease are measures that will also decrease the incidence of other infections among his cattle—for example, coccidiosis, tuberculosis, brucellosis, and any and all infections for which the principal portal of entrance is the digestive tract.

It is a matter of simple economics that, in the long run, the cost and trouble of prevention is less expensive than the cost and trouble of dealing with a disease after it is once established in a herd.

In the midst of current and more immediate disease problems, the livestock owner is too likely to forget the effects of an endemic outbreak of Johne's disease in his herd. As a rule, only one or two cases will show up on a

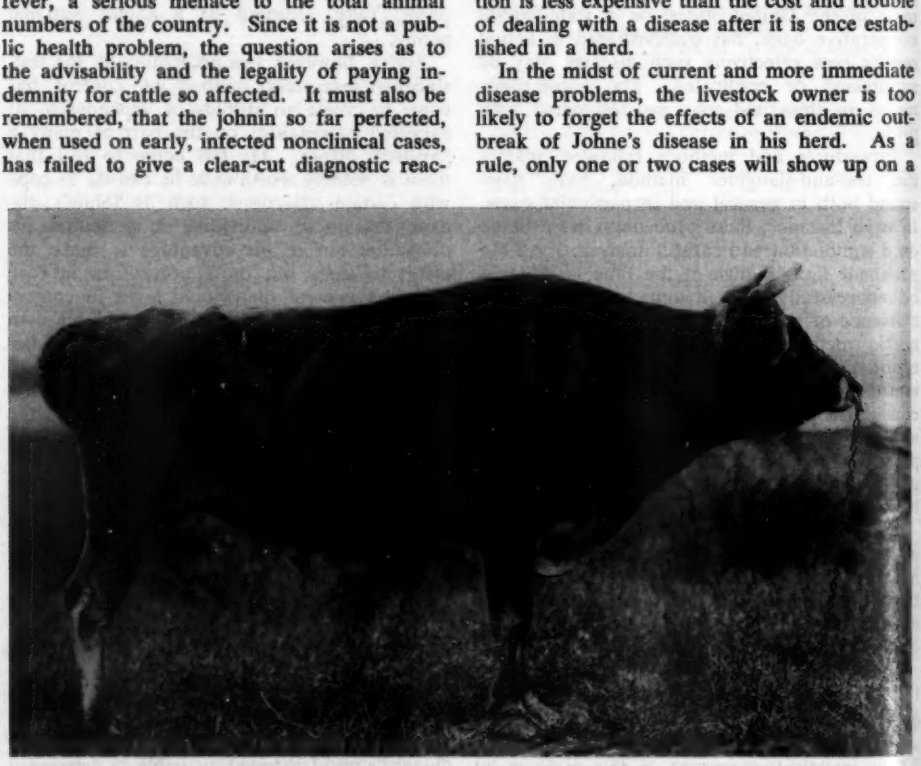

Fig. 1. This imported bull was never in contact with the other cattle in the herd, and was maintained on noninfected premises from the time of its arrival. Some months after purchase, the bull developed pronounced symptoms of Johne's disease. It was killed and autopsied at the Department of Animal Pathology, Kentucky Agricultural Experiment Station.

farm over a period of a year following the introduction of the infection; but the possibility of a widespread infection in a herd is always present, and with it the certainty of heavy losses. In some cases it has been necessary to dispose of entire herds, at great economic loss.

History

The nature of Johne's disease has been discussed for over 55 years. Every text book on diseases of cattle includes a history of Johne's, and many research bulletins and journal articles have been published on its various aspects.

The first description dates from about 1895 when an acid-fast bacilli was found to be numerous in the diseased mucosa of the intestines. Rapid confirmation of the presence of these bacilli by numerous investigators in many countries left no doubt that this bacillus was the true cause of the fatal, chronic diarrhea of cattle that had been recognized clinically for many years.

Since the causative agents in both tuberculosis and Johne's disease are acid-fast bacilli, Johne's disease was first thought to be a form of tuberculosis. As a result, such names as pseudotuberculosis, paratuberculosis, chronic specific enteritis of cattle, and infectious bacterial enteritis of cattle were in common use.

With the development and universal application of the tuberculin tests, chronic tuberculosis has become extremely rare in any country where control and eradication of this plague have been undertaken. As a result, the overlapping characteristics of chronic cases of Johne's disease and chronic generalized tuberculosis, in which affected animals may become emaciated, are no longer thought of as being common to the two disorders.

As bacteriological studies on the Johne's bacilli progressed, and comparative studies were made of this and other diseases having similar features, differential diagnosis has become easier. Today, it is stomach worm disease of cattle that clinically most closely resembles Johne's disease. Bovine coccidiosis, initial cases of looseness of the bowels, and particularly any chronic diarrheas accompanied by emaciation must also be considered in making differential diagnosis.

Differential Diagnosis

There are several features rather characteristic of Johne's that are sufficiently different from other similar-appearing diseases so that the livestock owner should be able to recognize the need for prompt action. If the diagnostic procedures confirm a Johne's infection, then stable sanitation and herd management can be started immediately.

Two main symptoms of both Johne's disease and stomach worm disease of cattle are a chronic, profuse diarrhea and loss of flesh, with a high mortality. The former usually occurs in stabled cattle, especially dairy cattle. It occurs most often in cows following their second and later parturitions. Where young animals are kept in close confinement with infected adults under conditions that are favorable to exposure to the infection, they will occasionally exhibit symptoms under two years of age.

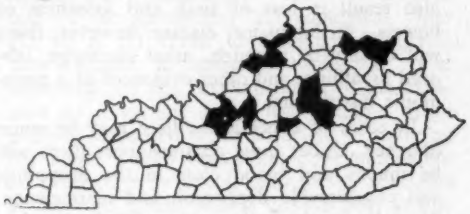

Fig. 2. The shaded areas represent Kentucky counties from which the author and coworkers have diagnosed Johne's disease in one or more herds, since 1920.

One may, now and then, see a typical case of Johne's disease in a yearling, but the anomaly may not always be recorded as such. A sick yearling is often disposed of without a diagnosis while a young cow in milk that develops the disease following the first, second, or third parturition would naturally receive more attention as to the nature of the illness. However, it has been shown experimentally and is generally accepted that in Johne's disease the incubation period may be long, particularly in young animals. Where losses have occurred in cows two and three years of age, a survey of the farm usually will show that animals were raised on the farm and, as calves, maintained under environmental conditions that had exposed them to infection a year or more earlier.

Stomach worm disease, on the other hand, is a pasture ailment. It is most common in young cattle six months to two years of age, and is comparatively rare in adult cattle. It is a herd affection in that a high percent of the young cattle in the pasture will manifest symptoms. An examination of the feces will reveal many parasite eggs. If the sick animal is sacrificed for autopsy, one or more of the several species of the small nematode parasites can be found in the abomasum. There will be no gross lesions of Johne's disease in the small and large intestines, nor will scrapings from the intestinal mucosa reveal Johne's bacilli.

Animals suffering from stomach worm disease will, if treated with phenothiazine, show improvement.

When chronic diarrhea has been observed in young dairy heifers and there has been no history of Johne's disease in the main herd, stomach worm disease would be the likely tentative diagnosis which even a clinical study and survey of the farm might confirm. For absolute certainty of the diagnosis, it is always advisable to carry out a more detailed examination.

Intestinal parasitisms of many kinds and lungworm disease of the bovine species may also result in loss of flesh and looseness of bowels. In lungworm disease, however, there will usually be a cough, nasal discharge, labored breathing, and other evidences of a pneumonic disturbance.

In cases of coccidiosis, there may be some diarrhea. Under these circumstances there will be mucus and blood clots in the droppings and considerable depression and inappetence. Several animals in the group will show rather closely developing symptoms, and death or recovery will be, in general, only a matter of days. Demonstration of Coccidia in the droppings is a simple procedure.

Sporadic cases of diarrhea may result from irritating or spoiled foods, impure water, succulent feeds, etc. There is also the so-called winter dysentery of cattle. These types of diarrhea may, in rare instances, result in death. The great majority of animals recover if properly treated, and if the feed is changed or modified in quantity and quality. A number of animals, usually stabled or barn-fed, generally will be affected at the same time.

Any of these illnesses can be diagnosed with a high degree of accuracy either by a direct approach to the problem or through a process of elimination. As a rule, the cause also can be definitely established or the condition correctly classified.

There are, then, these already classified instances of diarrhea and loss of flesh and probably, at times, other less well-known causes. The importance of considering a great number of intestinal upsets in the procedures of a differential diagnosis depends upon the area of the country and the type of intestinal diseases already established as peculiar to the bovine species in that area.

Johnin as a Diagnostic Agent

After the successful use of tuberculin as a diagnostic agent, determined efforts were made to find an equally reliable one for Johne's disease. Work on the product known as johnin was started some 30 years ago. In Wisconsin, New York, and at other state institutions, artificial cultivation of the Johne's bacilli has received special attention. More recently, the Regional Animal Disease Research Laboratory at Auburn, Ala., has carried on intensive research to find a satisfactory method of propagating the bacilli and perfecting a diagnostic agent. It has been foremost in the minds of bacteriologists and others that cultivation of the bacillus would lead to the production of a thoroughly reliable diagnostic agent which would, in turn, establish a foundation for dealing with the disease.

Johnin is perhaps the best diagnostic agent for Johne's disease available today, although personal experience and observation have suggested that a double strength avian tuberculin is equally as reliable. The veterinarian and livestock owner, however, must realize that neither agent will pick up all cases, particularly those in which the bacillus has only recently entered the alimentary tract. In such cases, the bacilli have not had time to multiply in numbers sufficient to produce inflammatory lesions in the intestinal mucosa and to cause digestive disturbances and diarrhea.

Origins of the Disease

Johne's disease is already widespread in the United States. It is generally accepted that one great source of infection lies in the enormous traffic in animals. It is a practical impossibility to keep livestock sale centers free of all infected animals and all infectious agents. This is particularly true of diseases like Johne's, where incubation period is a matter of months and years. At present, however, even the animal with symptoms of the disease is not barred from the sale ring.

Most state laws have a blanket statement that an owner must not knowingly offer for sale an animal affected with an infectious or contagious disease. But, in most cases, it would be impossible to prove that an owner or sales agency knew that a cow, offered for sale, had Johne's disease. Some of the animals, bought or sold, that later develop the disease may have previously been symptomless, and could not at that time have been definitely pronounced as infected. In such cases, the accurate supposition is that the animal was out of an infected herd and had recently acquired the infection. In other instances, the animals are clinical cases at the time of sale, and just how much the seller knew about them would be difficult to prove. It becomes, then, a question of integrity, knowledge of the disease, and honest ignorance of its nature. There are

well-known instances of all these conditions.

Certainly it is known that infected cows have and do go through the sale rings, both public and private. If not bought for slaughter, the cow may go to traders and visit many farms before death actually occurs, spreading infection from place to place. Such cases and carriers are known, and probably if the total of these were compiled, the number would be most discouraging.

Fortunately, Johne's disease is not highly contagious. It is not readily transmitted by casual contact. The manure of an infected animal is teeming with the Johne's bacilli, but to contract the disease a cow must take in these organisms through its mouth. Therefore, the infection is spread from cow to cow by contamination of the feed and water with manure from infected animals.

Conceivably a noninfected cow may lick an infected animal whose tail and rear quarters are soiled with semisolid excrements, undoubtedly containing many bacteria, and thus become infected. A calf nursing an infected mother could easily become infected, and calves kept in a small stable and pastured on a small lot with an infected cow are known to have contracted the disease.

In a badly infected herd, the origin or source of the spread of infection can usually be determined from a study of the sanitation, environment, and age of animals developing the disease.

Incubation Period

In several instances, observations and studies of herds have suggested that the incubation period may extend from six to 18 months. From the writer's studies, it seems possible that a heifer calf harboring the infection at six months to one year of age may not break with symptoms until one or two years later. This also suggests that young animals are more resistant to the infection than older animals.

It has been universally observed that cows most often develop symptoms shortly after parturition, and most often following the second rather than the first calving. These younger animals may conceivably have been carriers of the bacilli for a long time. In older cows, that break with the disease following parturitions, it would seem that they had become infected as adults and that the period of incubation was shorter in adults than in the younger animals.

Part II—Control and Prevention, will appear in a later issue of Veterinary Medicine.

Foot-and-Mouth Disease Research at Pirbright

Evidence of the scope of work at Pirbright, England, is contained in a recent progress report prepared by the Agricultural Research Council. A comprehensive report is being prepared that will review the large number of investigations carried out during the past 12 years.

An extensive series of experiments has indicated changes in the disease virus. These strains are variants, and while belonging to one of the recognized immunological types (O, A, or C), differ to the point of significant variation in immunity conferred. It is explained that the first indication of the existence of a variant strain was obtained from samples submitted to the Pirbright Institute by the Joint United States-Mexico Commission. At present, a large collection of virus strains of foot-and-mouth disease virus is held at Pirbright awaiting further research.

▾ ▾ ▾

Association of Military Surgeons to Convene in Washington

The 59th annual convention of the Association of Military Surgeons of the United States will be held at Hotel Statler, Washington, D. C., November 17-19, 1952. Two veterinarians will appear on the program during the general sessions of the Association. Colonel W. O. Kester, USAF (VC), will discuss Modern Military Veterinary Medicine, and Dr. Frank Todd (FCDA) will present the subject Veterinary Medicine in Civil Defense.

The afternoon of November 19, panel meetings of the various sections will be held. The Veterinary Section has arranged the following program: Current Status of the Vesicular Diseases, Dr. C. L. Gooding, Inspection and Quarantine Division, BAI, U. S. Department of Agriculture, Washington, D. C.; Nerve Gases, Col. Milward W. Bayliss, M.C., Medical Laboratories, Army Chemical Center, Maryland; Veterinary Aspects of Military Government—Civil Affairs, Brig. Gen. Crawford F. Sams, M.C., MFSS, Brooke Army Medical Center, Fort Sam Houston, Tex.; Whole Body Irradiation of Large Animals, Col. B. F. Trum, VC, UT-AEC, Oak Ridge, Tenn.

General McCallam, president, Veterinary Section, extends a cordial invitation to all veterinarians to attend.

Swine Brucellosis Control In A Herd With Valuable Blood Lines

ALVIN B. HOERLEIN,* D.V.M., Ph.D., and T. S. LEITH,** D.V.M.,
Ames, Iowa

FOR a number of years, one phase of the swine brucellosis investigations of the Veterinary Research Institute has been carried out in an institutional breeding herd developed for the purpose of intensive study of genetics and heritability in swine. The control of brucellosis in this herd presented interesting problems because of the heavy initial infection, its size, and unusual breeding program which produced individual animals genetically invaluable and the fact that for many years no animals were added from outside.

This herd, with an inventory of 800 to 1,000 animals, farrows approximately 185 litters in the spring and 100 litters each fall. During the 11-year period under consideration, almost 24,000 agglutination tests were recorded in addition to certain other information. In the following summary some of these data are collected in order to emphasize certain factors important in swine brucellosis control.

From the beginning, these investigations have had the close support of the laboratory, which made detailed examinations of animals and specimens from the herd. This, together with parallel controlled experiments, made it possible to follow progress in the herd as the control procedures developed. Initially, emphasis was placed on the fundamental nature of the causative agent (*Brucella suis*) and attempts to enlarge on the understanding of the pathology and pathogenesis of the infection. While the control procedures used were developed to apply specifically to the disease problem in this herd, efforts were made to determine to what extent they might be applicable to brucellosis control in farm herds. After the clinical disease had been controlled, more interest was directed to the determination of the extent of residual infection and its elimination.

The breeding operations originally concentrating on 12 Poland-China inbred lines and one Landrace line were started on farm A in 1930. In 1938, the herd was moved to a large new farm several miles away, and referred to in this article as farm B. At the time of removal, clinical swine brucellosis was not obvious. However, infection was not culled out by physical examination nor by the blood testing as carried out before the move was made. In 1939, typical swine brucellosis became a serious problem on farm B.

In 1940, the disease situation became intolerable and sporadic agglutination testing was replaced with a control program which consisted first in intensive testing and removal of reactors. An attempt was made to remove all the infected animals from farm B as soon as they reacted to the agglutination test (positive 1:25). They were sold for slaughter or if genetically indispensable, removed to farm A where those infected animals were kept in isolation until their progeny became established at farm B. After these isolated reactors farrowed on farm A, their litters were weaned at 56 days of age and tested. Those young weaned pigs found to be negative were moved to an isolated secondary quarantine area on farm B and after passing at least two more clean tests at least 30 days apart, were added to the herd at farm B. This was a closed herd with no accessions from the outside from 1938 to 1948. It should be borne in mind that even in the presence of swine brucellosis, genetic considerations had first priority over control procedures.

Until October 1945, all 1:25 reactors were considered as infected and moved out of the herd on farm B as soon as found. After October 1945, the 1:25 reactors were left in the herd subject to retest. The routine testing included all animals before breeding, sows before farrowing and sows at weaning. This was supplemented by other testing as thought desirable.

Discussion

The agglutination test results are summarized in table 1. Since the work was started in October of 1940, it will be noted that only three months of testing appear for that year.

*Veterinary Research Institute, Iowa State College, Ames.
**Animal Pathology Section, Agricultural Experiment Station, Iowa State College, Ames.

As expected, the number of reacting animals dropped quickly and the clinical effects of the disease were soon controlled. In 1943, and again in 1945, no 1:100 reactors were found. However, in August of 1946, a gilt aborted in a pen with 56 other pregnant gilts and *Brucella suis* was isolated from a fetus. Fortunately, there was no evidence of spread of infection subsequent to the abortion. In October 1947, a young boar nearing breeding age was found to have a high agglutination titer and upon bacteriological examination was found to be harboring *Br. suis*. From that time through 1950 the herd has appeared to be free of brucellosis. The 1:100 reactor noted in 1950 was a gilt, but on postmortem examination Brucella could not be recovered.

It is interesting to note how long residual infection remained in the herd, which observation has added significance when one takes into consideration the fact that no animals were added to the herd from outside sources.

It is now recognized that a program of testing with the removal of reactors is not well adapted to swine brucellosis control, especially in a large, highly infected herd. This can be explained in the light of present knowledge which shows that swine have a tendency to spread the infection as carriers even after their agglutination titers have gone to negative. In this herd, the secondary consideration of the disease coupled with the necessity for constant sorting, mixing, weighing and handling of animals, often in common areas, were factors leading to many contacts between animals. The fact that the herd was closed to outside accessions eliminated the chance of reinfection from added animals. The number of low-titer reactors now found in the herd is not considered excessive since many clean herds in the writers' experience have a higher percentage of low-titer reactions.

From 1940 to 1946, 287 of the reacting animals were retested at varying intervals of time. The fate of these as shown by the titers of the first retest after being found to be reactors is indicated in table 2. Since 1946, most of the animals retested have been negative to the next test, but an occasional animal is found which retains a low titer for many months.

A very practicable application from the work in this herd has come from a study of the isolation procedures used. When reacting animals from farm B were moved to farm A to produce pigs to be added back to the herd at farm B, blood lines were maintained and the disease controlled. Three or four of the inbred lines were salvaged by this procedure.

TABLE 1. Agglutination Test Results

Year	Total Tests	Tests Positive	% Positive	Animals Positive	Positive 1:25	Positive 1:50	Positive 1:100	Positive 1:200
1940 (3 mo.)	1,044	222	21.26	43	18	9	3	13
1941	3,522	331	9.40	196	95	50	18	33
1942	3,581	262	7.32	83	58	10	6	9
1943	1,810	58	3.20	34	27	7		
1944	2,157	59	2.74	49	44	4	1	
1945	2,142	48	2.24	34	30	4		
1946	1,960	75	3.83	43	35	6	1	1
1947	1,851	74	3.94	55	48	6		1
1948	2,032	24	1.18	22	22			
1949	1,945	35	1.80	19	17	2		
1950	1,749	100	5.72	97	81	15	1	
	23,793	1,288		675	475	113	30	57

From 1940 to 1946, 3,747 of the pigs farrowed at farm B were tested. Of these, 426, or 11.4%, reacted sometime during their life. During the same period, 743 pigs born at farm A were added to the herd on farm B after passing through the quarantine and clean tests as described above. Ninety-eight, or 13.2%, of these reacted some time during their life. In no case was a new focus of infection traced to animals added from farm A. It is our opinion that the success of this procedure was due to the removal of the baby pigs at weaning and not due to their testing at that time. In fact, it was a rare occurrence when weanling pigs were found which reacted to the test and those reacted only in the 1:25 and 1:50 dilutions. It would seem that the testing of weanling pigs is without value. Testing of young pigs becomes more and more valuable as sexual maturity is reached.

Routine agglutination testing is being con-

TABLE 2. Retests on 287 Reactors to the Agglutination Test — 1940-1946. Retested at Various Time Intervals after First Reaction Found.

Titer of Retest	Titer of the Original Test 1:25	1:50	1:100	1:200	Total
Same	83 - 44.9%	12 - 28.6%	3 - 12.5%	6 - 16.7%	104 - 36.2%
Up	39 - 21.0%	8 - 19.0%	6 - 25.0%	5 - 13.9%	58 - 20.2%
Down-not neg.		20 - 47.6%	15 - 62.5%	24 - 66.7%	59 - 20.6%
Down-to neg.	63 - 34.1%	2 - 4.8%	0 - 0%	1 - 2.8%	66 - 23.0%

tinued in this herd in the hope that new infection, if introduced, may be detected before a large part of the herd is exposed. If reinfection should occur, a study of previous animal movements coupled with immediate agglutination tests would be used to determine which groups were infected and exposed to infection. Groups appearing free of infection would be isolated by segregation in units and retested 30 days later to demonstrate the absence of infection. The entire exposed group could be disposed of except for those animals genetically indispensable. Those would be segregated from the rest of the herd by strict isolation (probably on the present farm) and their blood lines preserved in their progeny removed from the infected sows at weaning. These young pigs would be added to the rest of the herd through quarantine after negative tests at breeding age. The experience in this herd would indicate that a program of testing and removal of reactors should not be used to any great extent, but that isolation by segregation would be relied on as the most practicable and efficient means to control and eliminate the disease.

Summary

The results of several swine brucellosis control procedures used over a period of years in a large infected herd kept under special conditions are discussed.

While a program of test and removal of animals reacting to the agglutination test was successful in controlling brucellosis, it could not be recommended as efficient because of the time and cost involved.

The procedure of removal and isolation of reactor animals to farrow on another farm, followed by the reintroduction of the resulting young pigs segregated at weaning and negative to the agglutination test, was successful in maintaining the blood lines without reinfection of the clean herd.

Hormone Treatment of Sows and Boars

G. C. POPPENHOUSE, D.V.M.,
Milledgeville, Illinois

On February 15, 1952, a client selected 40 Chester White gilts from his main herd for breeding purposes. These gilts were placed on a good balanced ration. February 28, 1952, two boars were purchased, isolated, and put on a balanced ration.

Hormone treatment was started two weeks later. The boars were injected with 15 cc. each of gonadin® on March 12 and 26. Gilts were treated with one dose of 10 cc. each. Three days later, the first of the gilts was in heat. On some succeeding days boars served two gilts each, though from eight to ten gilts were in estrum. Six gilts came back in heat approximately three weeks after boars were removed from the herd. These were shipped to market.

®Cutter Laboratories, Berkeley, Calif.

The first 24 sows farrowed over a six-day period. Ten more sows farrowed during the next three days. A total of 34 sows farrowed within a nine-day period, with an average of 8.2 pigs per sow or 279 pigs. The pigs averaged 3 lb. each at birth. All sows were sheltered in individual, floorless houses in an alfalfa pasture. The pigs were so uniform in size that they were permitted to run together from the first day of farrowing. The sows produced plenty of milk so robbing or fighting was at a minimum. At this writing, no losses have occurred.

Although this report covers only one herd, it is felt that good results can be expected from hormone treatment in any herd if care is given to early and careful selection of sows and boars, provision for balanced rations, and supplementation of all the good sanitary practices of swine management.

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A working day for beef cattle, according to Canadian observations, is 16.8 hours.

Prophylactic And Therapeutic Use Of Aureomycin In Retained Placenta In Cows

JACK H. BEATTIE,* D.V.M., and JOSEPH D. LEAMING,** V.M.D.

POSTPARTUM uterine infections in cows, often resulting in temporary or permanent sterility, are a frequent sequel to the pathological retention of placental membranes. While manual removal of these membranes frequently can be accomplished with little difficulty, those retained following abortion, dystocia, and birth of twin calves often present problems both from the standpoint of ease of operative procedure and subsequent establishment of postoperative infection. When membranes are removed manually or where there is pathological retention of placenta, the use of an effective chemotherapeutic agent to treat or to prevent endometritis or metritis is of primary importance. This report presents the results of such uterine medication with aureomycin oblets®. Each oblet is composed of 0.5 gm. crystalline aureomycin hydrochloride in a soluble, nonirritant base compressed into a 5 gm. oblong tablet.

Clinical Use

It has been our experience that complete removal of retained placenta has been possible in about 60% of the cases treated. In at least half of the remaining 40%, membranes are so tightly adherent to the cotyledons that operative procedures are contraindicated. The majority of these are in animals that have aborted. In the remaining 20%, intact removal of a portion of the membranes is possible but placental shreds frequently remain attached to a part of the uterine mucosa. It is following the partial removal of placental membranes in this last group that the development of many cases of acute metritis have been observed despite the use of previously available accepted forms of uterine medication.

A total of 612 cows with retained placenta have been treated over a period of approximately one year. Where complete removal was accomplished, or where portions of the placenta remained, one oblet was introduced into the uterus. In cows giving birth to twins, one oblet was introduced into each horn. In approximately 95% of these cases, this was done in 24 to 50 hours after parturition. Stilbestrol, in doses of 15 to 35 gm., was administered intramuscularly, at the same time to stimulate, if possible, uterine involution. In all but two cases treated in this manner, there were no postoperative complications. Cows quickly returned to normal with no evidence of abnormal discharges. In two cases where some portions of the membranes remained, acute metritis developed. In addition, in one of these animals, acute mastitis, and some pulmonary congestion were noted two days following treatment. In the other cow, a clinical diagnosis of traumatic gastritis was made, with death occurring on the fifth day.

Where removal of placental membranes proved difficult, one oblet was introduced into the uterus, and no effort was made to remove the membranes for at least 72 hours. In the majority of cases, removal attempts at that time resulted in a more easily accomplished surgical procedure than has been experienced following other forms of therapy or prophylaxis. In no case did any clinical symptoms of septicemia or postoperative infection occur, and there was no abnormal uterine enlargement on rectal palpation.

In one herd, 12 cows had aborted prior to treatment in the seventh and eighth months of pregnancy. All showed positive pretreatment reactions to the serum-agglutination test for brucellosis. The placenta could be removed easily from only one cow. Eleven were treated with one oblet each, and treatment was repeated every three days with no further attempt at manual removal. The membranes were subsequently expelled in nine to 14 days with no evidence of abnormal discharge or septicemia. Of these 11 cows, one did not conceive following treatment. Of the ten which did conceive, three have aborted to date.

Comment

While few published reports on the bacteriology of the bovine reproductive tract have appeared, other than those on brucellosis and

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vibriosis, many species of bacteria are considered to be involved in postpartum uterine infections which frequently affect the reproductive capacity of the cow. In a study on the bacterial flora of 100 normal animals, Weitz[1] reported the isolation of streptococci, staphylococci, coliform organisms, and diphtheroid bacilli. Similar isolations were made from 180 infertile cows, but, in 27.6%, *Corynebacterium pyogenes* was associated with an endometritis characterized by copious purulent discharge, in contrast with its rare occurrence in normal or sterile cows without abnormal discharge. The findings of Hatch, Feenstra, and Jennings[2] closely correspond.

Marked bacteriostatic activity of aureomycin against a wide range of pathogenic organisms, many of which may be associated with uterine infections, has been reported. The use of aureomycin oblets is an effective adjunct to the treatment of retained placenta and endometritis which are often caused by mixed infection. Table 1 summarizes results obtained by Kanegis and his associates,[3]

TABLE 1. In vitro Aureomycin Sensitivity of Various Animal Pathogens (3, 4, 5)

Organism	Aureomycin — Mcg./ml. inhibiting growth
Corynebacterium spp.	0.1 - 1.25
Staphylococcus albus	0.02 - 25.0
Staphylococcus aureus	0.02 - 12.5
Streptococcus spp.	0.05 - 1.25
Escherichia coli	0.24 - 3.9
Clostridium spp.	0.01 - 0.16
Pseudomonas aeruginosa	0.48 - 10.0
Vibrio fetus	0.08

Pelcak, Metzger, and Dornbush,[4] and Kiser and deMello,[5] of *in vitro* activity of aureomycin against some pathogens which may be involved in these conditions.

Conclusions

Over a period of approximately one year, 612 cows with pathologically retained placenta have been treated with aureomycin oblets, following manual removal of the membranes, or introduced into the uterus with membranes intact. In 610 cows, there was no clinical evidence of postoperative infection or septicemia. In two cows, where membranes were only partially removed, acute metritis developed.

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Bird Transmission of Foot-and-Mouth Disease

Investigation of the cause of a series of outbreaks of foot-and-mouth disease in the eastern counties of England indicates the probability that migratory birds served as mechanical carriers[21].

The theory of airborne infection, starlings as vectors, is not new. It has been the subject of experimental investigation at Pirbright, England. It was found that birds excreted virus in droppings from ten to 26 hours after ingestion of infectious materials. Virus was also recovered from feet and feathers up to 91 hours after experimental contamination. Effects of air currents and weather factors may well influence the time that virus may remain viable, but the fact that sea crossings are made by these birds in three to four hours emphasizes the likelihood that disease could be spread with ease.

It has been brought out by the authors that starlings in England are frequently observed in close association with grazing animals. It is not uncommon to see these birds perched on the backs of cattle and sheep or picking food particles within inches of their muzzles.

The possibility appears obvious that whenever serious outbreaks of foot-and-mouth disease occur on the European continent, particularly that portion immediately across the channel, disease in England can be expected following autumn migration.

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Only four or five eggs are available for each person each year in Pakistan, Indian nation of 80,000,000 population.—*S. N. L.*

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Treatment Of Cattle Scabies With Lindane

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THE incidence of psoroptic scabies in cattle is becoming less prevalent in the United States, although sarcoptic and especially chorioptic mange appear to be increasing. Surveys in New York, conducted in 1948 under the supervision of the New York State Veterinary College and the U. S. Bureau of Animal Industry, revealed that sarcoptic and chorioptic mange were present in many herds throughout that state[1]. Skin scrapings taken from animals suspected of having scabies and submitted by federal, state and practicing veterinarians to the Laboratory of Parasitology, New York State Veterinary College, Ithaca, from 1946 to 1950 disclosed that 70% of specimens contained chorioptic scabies mites, 20% sarcoptic, and 10% both types. No common nor psoroptic scabies mites were found among the samples submitted. Incidence of chorioptic and sarcoptic cattle scabies among livestock is much higher than generally realized.

The chlorinated hydrocarbon insecticides commonly employed for treatment of cattle scabies are lindane and technical benzene hexachloride (BHC). In New York State, lindane in a concentration of 0.045% has been used extensively for treating scabies-infested cattle. Its effectiveness for eradication in concentrations higher than 0.045% had not been tested there previously. The purpose of this paper is to report results obtained by using concentrations of lindane, ranging from 0.045 to 0.12% in New York and Illinois for the treatment of cattle infested with chorioptic and sarcoptic scabies mites. These observations were made by Kemper in the late winter of 1950 and spring of 1951.

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Materials and Methods

Thirteen herds, seven in New York, five in Illinois and one in South Dakota were selected for these tests. All animals were sprayed with aqueous suspensions of wettable lindane, the concentrations ranging from 0.045 to 0.12%. The spray was applied with power-driven sprayers developing from 200 to 500 lb. of pressure per square inch. During the periods of coldest weather it was necessary to warm the water used, but at no time was the temperature of the spray more than 80 F.

Some of the animals were sprayed individually inside the barns, confined in stanchions or in box stalls. Others were sprayed out of doors, where they were put into pens in small groups of five to ten head, and given as much individual attention as possible. Complete wetting of each animal was attained by careful and thorough spraying. Particular attention was paid to the body areas where scabies lesions are most commonly found, such as the escutcheon, tail head, inside of the thighs and under side of the abdomen, brisket and neck.

Success or failure of the treatment was determined by careful post-treatment examina-

The importance of thorough saturation of the underline escutcheon, and axillary space with spray material, cannot be overemphasized. Lesions of scabies are common in these body regions.

tions. Lesions on individual animals were examined for signs of healing, and skin scrapings were taken from several animals in each herd. These were examined under a microscope for the presence or absence of live mites.

Natural decline of the mite population, with the advent of warm weather in the spring, made it advisable to conduct most of the post-treatment examinations the following fall and winter. Therefore, herds treated during February were examined the first time the following May, and those treated from March to May were not examined until the succeeding fall and winter.

Discussion of Data

Details of the experimental data and the results of the post-treatment examinations appear in the accompanying table, and speak for themselves.

Two types of scabies, chorioptic and sarcoptic, were treated in these herds, but common or psoroptic mange was not detected. In some herds, and on a few individual animals, both sarcoptic and chorioptic scabies mites were found. Active lesions were found on approximately 10 to 20% of animals in each herd. The scabies lesions were present most frequently on the escutcheon, extending from this region upward to around the tail head and outward on the hind legs; lesions also extended forward to involve the inner aspect of the thighs and flanks. On some animals, lesions extended forward along the underside of the abdomen to the brisket. The most advanced cases had lesions involving the previously mentioned body areas and extending down the hind and front legs involving the region of the hock and knee.

The irritation produced by the mites was intense and caused extreme restlessness and discomfort. In an attempt to relieve the irritation, animals were constantly biting, scratching, rubbing and kicking at the infested areas. Among dairy cattle, restlessness of the animals was a constant source of annoyance to the owners.

It was the writers' intention to cover each animal completely with the spray, but the certainty that this was actually accomplished may

TABLE 1. Data on Treatment of Cattle for Destruction of Scabies Mites

Test No.	No. of Animals	% Concentration	Date Sprayed	Gal. Spray Used Per Animal	Type of Infestation	Where Sprayed	Dates of the Post-treatment Examinations and Results				
		0.06	2-6-50			Inside barn	5-11-50	11-21-50	12-10-50		
1	35	0.06	2-16-50	3	Chorioptic	Stanchions	Negative	Positive	Positive		
		0.06	2-7-50				5-11-50	10-24-50	12-10-50	2-27-51	5-27-51
2	27	0.06	2-17-50	3	do.	do.	Negative	Negative	Negative	Negative	Negative
		0.06	2-6-50				5-19-50	10-23-50	12-19-50	1-25-51	
3	20	0.06	2-16-50	3	do.	do.	Negative	Negative	Negative	Positive	
		0.06	2-6-50		Chorioptic		5-19-50	10-23-50	12-18-50 Positive		
4	45	0.06	2-16-50	3	Sarcoptic	do.	Negative	Negative	Chorioptic		
		0.045	2-13-50				5-19-50	10-24-50	12-18-50		
5	67	0.075	2-23-50	3	do.	do.	Positive	Negative	Positive		
		0.045	2-11-50				5-19-50	10-25-50	12-10-50		
6	83	0.075	2-18-50	3	do.	do.	Positive	Negative	Positive		
		0.075	2-16-50				5-15-50	10-23-50	12-18-50	2-27-51	1-19-52
7	32	0.075	2-26-50	3	Chorioptic	do.	Negative	Negative	Negative	Negative	Negative
		0.075	3-28-51		Chorioptic	Outside barn	11-8-51	2-1-51 Positive			
8	45	0.075	4-9-51	4	Sarcoptic	Large pen	Negative	Chorioptic			
		0.075	4-29-51			Inside barn		2-1-52			
9	18	0.075	5-10-51	3	Chorioptic	Box stall		Negative			
		0.075	4-2-51			Outside barn	11-7-51				
10	100	0.075	4-17-51	3	do.	Large pen	Positive				
		0.075	5-16-51				6-5-51	9-18-51	11-16-51		
11	42	0.075	5-28-51	5	do.	Inside barn	Negative	Negative	Negative		
						Outside barn	11-7-51				
12	100	0.12	4-2-51	3	do.	Large pen	Positive				
						Inside barn	11-7-51	2-1-52			
13	80	0.12	4-9-51	4	Chorioptic	Box stall	Negative	Negative			

be open to some question. When the animals were sprayed indoors, confined to stanchions or box stalls, a more thorough spraying was accomplished and coverage of the animal was more certain. When sprayed outside, free movement of the cattle made it more difficult to wet the animals completely, and the deep mud and slush interfered with the movements of the spray operators. Mud and dirt on the legs and abdomens of the animals prevented the spray from reaching these areas in sufficient quantities to be altogether effective.

Summary and Conclusions

As a result of these trials, it was determined that wettable lindane sprays having concentrations of 0.06%, applied twice at ten-day intervals to four herds, failed to eradicate chorioptic scabies or a combination of chorioptic and sarcoptic scabies in three herds. In the one remaining herd so treated, chorioptic scabies was eradicated.

Treatment with wettable lindane sprays having a concentration of 0.045%, followed by a second treatment with a spray having a concentration of 0.075%, applied at ten-day intervals, failed to eradicate a combined infestation of chorioptic and sarcoptic scabies in two herds.

Single treatments with lindane sprays having a concentration of 0.12% resulted in eradication of chorioptic mange in one herd and the eradication of sarcoptic, but not chorioptic scabies in another herd.

Treatment of five herds with two applications of wettable lindane having a concentration of 0.075%, at ten to 12-day intervals, resulted in eradication of chorioptic scabies in three herds, but failed to eradicate the infestation in the two remaining herds.

In general, better results were obtained when cattle were sprayed indoors in box stalls or stanchions, where individual attention could be given to each animal, and from four to five gallons of spray used per head.

Sarcoptic scabies in cattle appears to be eradicated more easily with lindane suspensions than chorioptic scabies. Treatment of four herds having combined infestations of chorioptic and sarcoptic scabies resulted in eradication of sarcoptic, but not the chorioptic scabies.

Acknowledgments

The authors wish to acknowledge the assistance of the state and federal livestock officials in New York, Illinois and South Dakota, as well as members of the New York State Veterinary College, who supplied the equipment, materials and help in conducting these tests.

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Psittacosis

Dr. George W. Cox, Texas State Health Officer, recently reported an outbreak of psittacosis which occurred among workers employed in a poultry packing house. Laboratory tests confirmed diagnosis in 29 persons. Ten other cases are being studied further. Four deaths were reported. In 1948, an outbreak occurred under similar conditions in a poultry processing plant in Texas, in which there were 22 cases and three deaths.

Recently, additional reports of psittacosis in chickens and turkeys have been received from other areas. There is increasing evidence that this disease has a broad host reservoir, including mammals in addition to birds. With the development of antibiotic therapy, the seriousness of the disease in man due to infection contacted from psittacine birds has decreased. The relatively high mortality reported in the above outbreaks is exceptional and is difficult to explain.

Since the modification of the U. S. Public Health Service Psittacine Bird Quarantine Regulations, there has been a small rise in the number of human cases reported. Most of these occurred during the winter and spring of 1952. The total attributed to psittacine bird contact in 1952 is less than the total attributed to occupational exposure.

Symptoms of psittacosis in parrots, love birds, lorikeets, parakeets, etc., are well known to many veterinarians. The symptoms include depression, ruffled feathers, diarrhea, loss of appetite, and emaciation. In domestic fowl, including ducks, chickens, and turkeys, there are no symptoms, or they are so general as to be of little diagnostic value. Even in psittacine birds symptoms are not pathognomonic. In all cases it is necessary to establish a diagnosis by laboratory tests. Any birds sent to a laboratory for diagnosis should be wrapped in a phenol saturated cloth and shipped in dry ice.

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Pneumoencephalitis (Newcastle disease) is the present most costly disease of poultry.

An Unsuccessful Attempt To Treat Avian Monocytosis With Antibiotics*

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A PREVIOUS report by other workers[1] indicated that pullet disease responded to aureomycin therapy. The present paper deals with an attempt to repeat this work.

Since other diseases have symptoms and lesions in common with avian monocytosis, major effort was directed toward the diagnosis of the condition, as well as toward finding a treatment. Jungherr and Matterson[2] adequately described a procedure of diagnosis. In the first part of this paper the writers have adhered in part to their procedures.

During the latter part of July 1951, an entire flock of 950 four-month-old pullets suddenly became ill. The first observed sign of illness was that the birds stopped eating but continued to drink much more water than normal. The major symptom was a profuse, fetid, whitish diarrhea. Apparently because of the diarrhea, the birds began to exhibit marked dehydration. Within five days, 20 birds died. At autopsy marked lesions were seen in the kidneys. These varied from a pale kidney with no urate material to one with marked urate deposits. A number of birds had powdery urate salts over the pericardium, liver and air sacs, a condition similar to visceral gout. The musculature had the dry "fish flesh" quality described by Jungherr and Matterson. Small intestines were inflamed and filled with tenacious mucus.

Small portions of the liver and spleen, and a small quantity of heart blood from these birds were seeded on 10% blood agar plates and were negative. Cultures of the intestinal contents for Salmonella organisms were negative. A few parasite ova were seen in scrapings from the intestines. The hemagglutination inhibition test for Newcastle disease was negative.

In view of the above evidence of avian monocytosis, 80 sick birds were selected from the flock for further study. Blood uric acid levels from three composite groups of ten birds each varied from 5.3 to 7.8 mg.% as compared with 2.8 mg.% for a healthy control group. Differential counts were made from blood smears. The average monocyte count of ten sick birds was 21% compared with 8% for the control birds.

Experimental

The pullets were then divided into two groups of 40 each. Within a few hours after the birds were placed in a room away from the heat of direct sunlight, they seemed to regain their appetites. All of the birds continued to drink abnormal quantities of water. At this time, one group of 40 birds was fed 100 parts per million aureomycin** in the mash. This ration was continued for the duration of the trial. The other group received the same basal ration with no antibiotic. During the next two weeks, daily observation did not disclose difference between the two groups of birds. One bird died from each pen. Mean weight gains were not significantly different between the two groups, although there was a constant slight gain in each group.

On November 21, 1951, three pullets from a flock of 80 birds were brought to this laboratory. The combs and skin of all the birds were cyanotic. During autopsy, the musculature tended to stick to the rubber gloves. A thinly cut section of muscle had a glassy appearance when held up to the light. Several faint necrotic spots were seen on the liver of one bird. Although the kidneys were swollen and pale, they did not show urate deposits at this time. During the next 24 hours, four more birds died. Autopsy revealed somewhat the same lesions. Bacteriological cultures from the first submitted birds were negative. Examination for intestinal parasites was negative.

Ten sick birds were selected from the flock and divided into two groups of five each. Differential blood counts of four of these

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**Furnished by the Lederle Laboratories Division, American Cyanamid Co., Pearl River, N. Y.

indicated a monocytosis. Five birds were then treated orally with 100 mg. of aureomycin in 10 cc. of water. The other five received 10 cc. of water without medication. Two birds died from each group within the next 24 hours. The lesions seen at autopsy of two of the birds were characteristic of visceral gout. Tissue sections of the liver, kidney, pancreas and pectoral muscle were made from a bird that died during observation. The major microscopic lesion of the liver was several foci of coagulation necrosis. Histopathological study of the kidney revealed dilation and degeneration of the tubules with numerous hyaline casts. There were areas of the kidney that had deposits of amorphous calcium salts. Microscopic examination of the pancreas exhibited several large spots of cloudy swelling. Examination of the pectoral muscle tissue revealed a few foci of degeneration.

Both groups of birds continued to lose weight for the next six days. At the seventh day the treated and untreated birds suddenly seemed to return to normal. The experience on the farm was somewhat the same as in the laboratory. Treatment via drinking water with 25 parts per million (p.p.m.) aureomycin did not prevent death. Eight treated birds died after the medicated water was substituted for the regular drinking water. All birds showed clinical improvement at the end of one week.

Concurrently with the studies on aureomycin, one of us (C.M.H.) conducted a field trial using terramycin† against avian monocytosis in layers. On September 17, 1951, two live Single Comb White Leghorn females from a flock of 650 chickens, one year of age, were presented for examination. The owner stated that the first evidence of trouble in this group, one of several groups of chickens on the farm, was observed September 14, 1951. The history was droopiness, blue combs, dehydration of the shanks and a decrease in egg production. Approximately 7% of this group showed these symptoms. The ration consisted of a commercial mash and scratch grains.

Upon examination, cyanosis of the head, shriveled skin on legs, foul smelling, watery diarrhea and distention of the crop with a sour smelling mixture of grain and mash was noted. The gross lesions were dehydration of the skeletal muscles, mucoid enteritis, slightly enlarged grey kidneys, congested liver and broken egg yolk material over the serous surfaces of the abdominal cavity. A stained blood smear from one chicken revealed 26% monocytes. Bacteriological cultures of the liver did not produce any bacterial growth. The hemagglutination-inhibition test for Newcastle disease was negative.

In the first group of chickens to be affected (referred to above), terramycin was administered in the drinking water at the rate of 100 p.p.m. The product used was terracon® which contained 180 gm. of terramycin per lb. The medication was started three days after the first symptoms were observed and was given continuously for nine days. Egg production had decreased from about 58% to 42% when treatment was started. During the next three days, there was a further decrease in egg production to 24%. Then for a period of seven days, the rate of lay remained between 24 and 28%. Egg production then gradually increased to 46%, 32 days following the lowest point of lay. The mortality was 5.1%, with 3% of this occurring the second day following observation of symptoms of blue-comb disease.

On September 18, a prophylactic treatment was started in a pen of 750 White Leghorns, seven months of age. These pullets were increasing in egg production when given terramycin in the drinking water at the rate of 25 p.p.m. Five days following the above treatment, egg production had increased from 74 to 79%, at which time there was a drop in egg production and symptoms of avian monocytosis were observed. The amount of terramycin was increased to 75 p.p.m. of the drinking water and given for six additional days. Five days following the onset of the disease, egg production decreased to 57% but returned to 70% ten days after this low point of lay. Mortality was a little over 2% for the outbreak.

The third group of chickens was first observed with avian monocytosis symptoms on September 20. There were 560 White Leghorns in this group which were 18 months of age and laying between 60 and 70%. Terramycin at the rate of 50 p.p.m. of the drinking water was given the first day symptoms were observed. This was given for four days and then increased to 100 p.p.m. for the next ten days. Egg production decreased in three days from the onset of the disease to 34%. Six days following the drastic drop in the lay there was an upward trend in egg production. During the first 11 days of the outbreak, 56, or 10%, of the chickens died.

In the fourth group there were 525 New Hampshire chickens, seven months of age,

†Furnished by Chas. Pfizer & Co., Inc., Brooklyn, N. Y.

®Chas. Pfizer & Co., Inc., Brooklyn, N. Y.

which were in about 65% lay. On September 20, terramycin at the rate of 25 p.p.m. of drinking water was started as a prophylactic treatment. Five days later symptoms of avian monocytosis were observed and the terramycin was increased to 50 p.p.m.

Egg production decreased until it leveled off at between 20 and 30%. The egg production in this pen would suggest a chronic form of the disease. During the first part of the outbreak, seven chickens died.

In other houses and pens located on this farm were 2,500 New Hampshire and White Leghorn pullets just starting to lay, 900 crossbred hens, 250 old hens of various kinds, and 435 Parmenter Red hens. Avian monocytosis was in evidence in all these groups, and they were treated with terramycin. Egg production and mortality records were not available. Located in close proximity to the laying flocks was a group of baby chicks and a group of 600 11-week-old fryers. There was no evidence of disease in these groups during the outbreak in the older chickens.

Discussion

Earlier in this paper it was pointed out that other diseases may have pathologic similarities with avian monocytosis. Since the cause or causes of this condition have not been established, the diagnosis rests upon the process of elimination of other diseases and the demonstration of the typical syndrome (Jungherr and Matterson[2]). Without a definite etiology, there is no assurance that treatment in one instance is directed against the same disease agent reported at another time. With this basic difficulty in view, it is logically possible to account for the differences in the results reported in this paper as compared to the report by Peterson and Hymas[1].

Summary

1. Aureomycin administered in the feed at the rate of 100 p.p.m. did not significantly increase the weight gains of birds affected with avian monocytosis when compared with untreated controls.

2. Oral administration of 100 mg. of aureomycin did not prevent death of some birds affected with avian monocytosis.

3. Under field conditions, terramycin was administered at 50, 75, and 100 p.p.m. of the drinking water to groups of chickens showing symptoms of avian monocytosis. These amounts of terramycin did not prevent a marked reduction in egg production nor prevent mortality. Terramycin was administered at the rate of 25 p.p.m. of the drinking water to two groups of chickens in egg production five days prior to the first symptoms of disease. This amount of terramycin did not prevent the occurrence of the disease.

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"CARE" Enlists Public Aid for U.N.'s Global Fight on Disease

For Americans who want to know what they can do personally to promote the universal well-being so essential to peace, the new CARE World Health Program offers an opportunity to join a global fight against disease, the enemy that needlessly kills, cripples or incapacitates millions of the world's people in underdeveloped countries.

Launched at the request of the United Nations' World Health Organization (WHO), the program will serve as a channel for meeting acute medical needs in critical health areas, through specific CARE packages or projects for which the public will be asked to subscribe funds.

Now under way as the initial project is a $60,000. campaign to establish an Iron Lung Bank in Asia. The funds will cover CARE's purchase and delivery costs for 30 respirators, at $2,000. each.

Ten respirators will be deposited in each of three hospital centers in Tokyo, Bangkok and probably Cairo (or some other Middle Eastern city). These centers will serve all of Japan, Thailand, Egypt, Afghanistan, Burma, Ceylon, India, Pakistan, Nepal, Indonesia, French Indo-China, and other nearby countries. At the call of WHO representatives, iron lungs and trained personnel to operate them will be sent from the nearest center into any area stricken by a polio epidemic.

Japan illustrates the need for this project. Polio, primarily a Western disease, has risen each year since our occupation troops arrived and now averages over 3,000 cases annually, with a mortality rate of 25%. Yet no Japanese hospital owns an iron lung.

Contributions in any amount to the Iron Lung Bank, CARE, 20 Broad St., New York

(*Continued on page 468*)

Treatment Of Urinary Calculi*

J. E. PRIER, D.V.M., M.S., R. M. THOMAS, D.V.M., and R. G. BRAMLET, B.S.,** Laramie, Wyoming

TREATMENT of urinary calculi in cattle and sheep is a difficult clinical problem common in several areas of the United States. The condition is particularly prevalent in the Rocky Mountain region. Herds have been observed in Wyoming in which the incidence is as high as 6%. Over-all incidence in some areas is approximately 2%.

Surgical intervention is the most common method employed to relieve the condition. It is often advisable to market animals as soon as possible. Occasionally it is possible to remove simple stones by dislodging them with a catheter or injecting acidic materials into the urethra. There are usually several stones present in the urinary tract. Removal of single stones may be succeeded by further obstruction.

Limited trials have been conducted on the product named depropanex®. This agent is a protein-free, nitrogenous extract of mammalian pancreas. Object of therapy is to relax the musculature of the urethra and thus allow the concretion to pass through the lumen. Spasms and constriction frequently are the major causes of stone retention. It is necessary that treatment be instituted early. If stones have formed projections, simple relaxation is not sufficient to dislodge the embedded object from the mucous membrane. Excessive inflammation of the urethra and urinary bladder, with chronic thickening of the walls, also inhibits action of the drug.

Case Histories

The following typical case histories illustrate the responses obtained by using depropanex on a clinical basis:

Case 1. Six-month-old Hereford steer. The animal was ill for approximately one week. Abdomen was distended, with marked ascites. Diagnosis of urinary obstruction with ruptured bladder was made. Abdominal fluid was drained by trocarization and 10 cc. of depropanex administered intramuscularly. A urethrotomy was performed, but apparently obstruction was present within the bladder. Treatment was repeated 24 hours later, at which time a small amount of urine was voided. Twenty-four hours after the second treatment, the steer was eating normally and made an uneventful recovery.

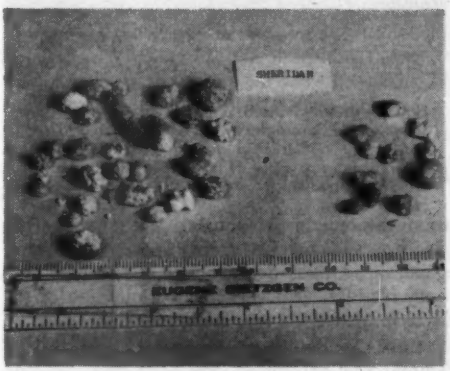

Fig. 1. Calculi removed surgically from steers in the Sheridan, Wyo., area. Each stone represents one affected animal.

Case 2. Two-month-old Hampshire ram. This animal was in good condition. Urination was strained and amount scanty. Swelling of the sheath was also present. Diagnosis of urinary obstruction was made. Ten cc. depropanex were given intramuscularly. Urine was voided with less difficulty and in larger amounts. Twenty-four hours later 3 cc. were injected. Urination returned to normal and the animal recovered completely.

Case 3. Two six-week-old Hampshire rams. Sheep had marked ascites, complicated by purulent urethritis. Straining was noticeable but no urine was passed. Diagnosis of urinary obstruction was made. Three 10 cc. doses of depropanex were given at 24-hour intervals. Seventy-two hours after therapy was started, both animals were urinating normally and made uneventful recoveries.

Case 4. Two-year-old Hampshire ewe. The animal was on an experimental diet and re-

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®Sharp & Dohme, Inc., Philadelphia 1, Pa.

ceived poor-quality hay with little supplement. General condition was poor; the animal prostrate. Marked ascites was present and trocarization revealed urine in the abdominal cavity. Five cc. of the test drug were given intramuscularly and 250 cc. of dextrose (20%)

Fig. 2. Urinary calculi removed by surgery from steers in the Saratoga, Wyo., district. Affected animals were not treated with depropanex. These concretions are typical of the calculi responsible for urinary obstruction in cattle and sheep in Wyoming.

administered intravenously. Death occurred 24 hours later. Necropsy revealed severe, generalized liver damage and a ruptured urinary bladder. Microscopic examination of the liver indicated complete fatty degeneration.

Case 5. Five-year-old Suffolk ram. This animal was extremely depressed and straining constantly to urinate. The sheath was swollen and painful and small calculi were palpated in the urethra. Massage resulted in passage of a small amount of urine. Ten cc. of depropanex were given intramuscularly. Relief was apparent in two hours. A second treatment was given 24 hours later. Recovery apparently was complete.

Case 6. Three-year-old Rambouillet ram. Ascites was present, with cessation of urination. Pulmonary rales and temperature of 106 F. indicated pneumonia complication. Three 10 cc. doses of the pancreatic extract under test were given 24 hours apart. Bacitracin (50,000 units intravenously) was used to treat the respiratory complications. The animal died 96 hours after the beginning of therapy. Pneumonia was grossly apparent in the apical lobes. Numerous calculi were found in the kidney, bladder, and urethra.

Case 7. Four-week-old Hampshire wether. The animal stretched in an attempt to urinate. Only small amounts of urine were voided. Forty-eight hours after urinary calculus was diagnosed, massaging the sigmoid flexure failed to bring relief and urination had nearly ceased. Two injections of 10 cc. of depropanex at 24-hour intervals resulted in resumption of urination.

Case 8. Six-week-old Suffolk male. Urination was decreased and a large amount of sand was found on the preputial hair. Two injections of 10 cc. of depropanex were administered at 12-hour intervals. The animal died. Autopsy revealed extensive inflammation of the urethral mucosa and deposits of sand in the lumen.

Discussion

Observations indicate that calculi are rarely or never spontaneously passed once they have caused complete obstruction. Although depropanex therapy is not the complete remedy for such cases, it undoubtedly has beneficial effects in many. At present, the writers administer the drug routinely to all cases of urinary calculi before attempting surgery, unless the life of the animal is in immediate jeopardy.

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Avirulent Anthrax Vaccine

It has been known for some time that when virulent strains of the anthrax organism are cultured on a 50% serum agar in an atmosphere that contains from 10 to 30% of CO_2, avirulent variants appear that have lost the ability to produce capsules and, therefore, their power to produce the highly fatal disease. It is these avirulent variants which form the basis of an antianthrax vaccine that is used in South Africa with alleged good immunizing effects, surpassing the spore vaccines. The South African vaccine can be used on all animals, in addition to cattle.

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In a thesis submitted as a requirement for a Ph.D. degree from Kansas State College, Dr. Ralph D. Barner of the pathology staff, School of Veterinary Medicine, Michigan State College, has this to say about the etiological agent of infectious keratitis of cattle: "In our work we have identified *Moraxella bovis* as the etiological agent of infectious keratitis of cattle. A pleuropneumonia or rickettsial-like organism has been recognized in conjunctival scrapings of sheep affected with pink eye. In contrast to findings of foreign workers, these organisms have not been identified as a factor in bovine infectious keratitis."

Ancient Chinese Insect Therapy In Human And Veterinary Practice

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THE ancient ancestors of the warring Red Chinese may have solved the Japanese beetle and other insect enemy problems for the entomologist, as literally billions of insect pests are caught in traps every year in communities all over the world. Directly, as a result of recent bio-assays, progressive drug and cosmetic manufacturers, human and veterinary biological supply houses, may yet obtain vitamins, hormones, essential oils, therapeutic proteins, and biologicals as insect derivatives.

Modern Concepts of Insect Therapy

It is known that insects taken internally really have therapeutic and vitamin food value both in human and veterinary practice. The praying mantis or hobby horse, for example, on bio-assay contains 58% protein, 12% fat, 3% ash, vitamin B complex, and vitamin A in insect-extracted carotenoids. Locust soup is eaten in South Sea island native communities as many ex-G. I.'s know from experience, and ground locust meal has been used in native cattle feedings.

The insect exoskeleton, chiten, is an interesting compound of sugar and amino acid. It yields acetic acid and glucosamine and contains about 7.5% of nitrogen. The dried centipede is composed almost entirely of muscle protein, chiten, mineral salts and a small amount of other compounds. The centipede was considered to be a very potent medicine, by the Chinese, for snake bite, facial paralysis, convulsions, or demon possession. Hornet's nest contains 7.52% of nitrogen, 11.3% of ash and 23% protein. Several species of insects are used as therapeutic agents in edema and possibly dropsy by the Chinese physicians today, due to their protein and vitamin B complex content.

Many insects have been subject to assays, which have revealed carotenoids as precursors of vitamin A in the human body and from these the established therapeutic value in diseases of the skin and eye is derived.

The extraction of vitamins from insects would probably be a difficult process and scarcely worth-while. Nevertheless, the ground-whole insects with high vitamin, protein, and essential oil content might turn out to be an advantageous undertaking. Dehydrated insects, like dehydrated milk, probably contain all the essentials of nutritional and vitamin elements in high concentration.

This concentrated extract of insect might also find its way into veterinary practice and as a cheap source of minerals and vitamins in livestock and dairy industries. At least some pharmaceutical insect assay research might prove valuable. This was the motivating reason for the preparation of this article. It opened a new possibility in nutritional sources and vitamin therapy in war time.

Historical Review

Confucius say: "What can't be cured, must be endured."

The Chinese, for centuries, have been pestered with insect enemies just as we have; but being philosophically minded, "these Oriental sons of Han" have utilized these pests as both food and medicine. Ancient Chinese pharmacists had a vast amount of experience and knowledge of the various metamorphoses of the silkworm, and gave clear ideas about the life cycle of the dung-beetle and some other common insects. Moffet, in 1634, compiled the Theatrum Insectorum citing the uses by Pliny, Galen, Dioscorides and all the old authorities, of more than 50 insects identical with those in the Chinese herbai or pharmacopeia. The Chinese recognized the astringent and hemostatic qualities of insect galls which were used for many centuries in Greece as a treatment for piles, bleeding wounds, and as an astringent to all mucous surfaces.

The Greek-Roman school probably originated the first pharmaceutical uses of the scorpion, seaworm, bedbug, locust, maggot, buprestis, newt, ascaris, house-fly, louse, dog-louse, butterfly, earwig, and water strider as therapeutic agents. Scorpions were used for skin diseases, malignant boils, suppurating ears, etc., in China, and are so identical historically, that the origin probably goes back to the ancient Grecian civilization. The bedbug was used as a medicine by Dioscorides, Galen, and others. Early European pharmacy recorded as

a cure for malaria fever and as a diuretic, the dog-house-flea and the pillbug. Pickled soy beans and woodlice cure malaria fever.

Veterinary Pill-rollers Please Roll 1,000 Pills

The scarab or dung-beetle was used as an amulet in ancient Egypt and Greece. For quartan malaria, a live insect was put in a red bag and hung around the neck. This was cast in a Chinese mold in the Sheng Hui Fang which orders one atlas-beetle (classed by the Chinese with the scarab), mixed with 2 oz. of lard, one garlic bulb, a handful of onions, and tips of fifth moon dumplings. At dawn, on the fifth moon, in a quiet spot, bareheaded, barefooted, the tongue is raised to the roof of the mouth and facing north, 1 lb. of this mixture is made into 1,000 pills. Each pill is wrapped in new cloth and tied on the upper arm; men on the left, women on the right, to cure malaria.

Horse Flies Cure Black Eyes According to Ancient Legend

The use of powdered dried horse flies snuffed into the nose was used to cure recurved eyelashes. Horse flies suck the blood of horses, so in medicine they are used to relieve congestion and remove extravasated blood, as in bruises and black eyes. On the same principle, woodpeckers always pecking grubs out of tree trunks, when administered in pills can pick out the worms from caries teeth which are said to cause toothache. Worms in the teeth as a cause of toothache goes back to the earliest Assyrian records.

Cosmetic Cows

The longhorn beetle is known as "heavenly cow" because the horns are like a water buffalo's. The poet, Su Tung-po, poked fun at such a name for he said they had two horns like a demon. Also, these insects are lazy creatures, and not hard workers like the buffalo, but only pests because they bore into mulberry trees and wither them. These beetles were used for severe convulsions in infants and canines and as a facial cosmetic in the Chinese beauty parlor.

Submarine Divers — Please Note

A Taoist devised empirical uses for Ping Yi or fairy pills containing spiders and leeches ground up, which will enable one to live under water. Spiders fed on lard, killed and smeared on the feet will enable one to walk on the surface of water, (frozen maybe?). Diving beetles cure diseases of the circulation, obstruction of the bowels and (doting mothers and night-parading papas, please note) "stops nightcrying" in children and puppies from stomach ache.

Bargain sales were not advocated in ancient Chinese mythology because flowers, leaves, and women's petticoats, under the influence of air and wind, changed into butterflies.

Honey Therapy

The composition of Chinese honey is much the same as that produced in other parts of the world, namely very concentrated form of invert sugar and a little dextrin. Its nutritive and laxative properties are well recognized. Orientals used honey to clarify the vision, and for pannus of the cornea in both man and animals. This therapy may be due to the riboflavin present, which we know by bio-assay today to be true.

Vet. O. B. Clinic

Ancient Chinese obstetrical and optical drug specialists used the cicada (17-year locust) to remove films over the eye, and also for difficult childbirth, calving, whelping, and for expulsion of the placenta. This remarkable physiological action is said to depend on the fact that the insect casts its skin.

The Toad

An amphibian, may not cure warts, but according to Doctor Ch'en's researches, the use of the toad venom by the old Chinese for hemorrhage of the gums and sinusitis appears justified because of the presence of the adrenalin, cinobufotozin, with arginine and suberic acid, and ergosterol. The anesthetic action accounts for its use for toothache and canker sores of cattle.

Food for Thought — Insects in Chinese Diet

Bee larvae were eaten by the ancient Chinese. Haydok had found vitamin E in their food. The Yunnan Chih say their people eat locusts, dragonflies, and bumble bees. Cockroaches and locusts were a favorite dish in Szechuan. T. T. Liw had a most interesting article on the use of insects as food in Kwangtung, where grasshoppers, golden June beetles, crickets, stinkbug, wasp larvae, silkworm larvae, etc., are eaten. In the novel and movie Good Earth, the plague of locusts could have been utilized as heaven manna for the starving Orientals.

(*Continued on page 466*)

Immune Response Of Ferrets To Vaccination With Egg-adapted Distemper Virus. I. Time Of Development Of Resistance To Virulent Distemper Virus

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THE first major contribution to the control of distemper by vaccination was the work on immunization with formalized tissue vaccines performed by Laidlaw and Dunkin[1] in 1928. In 1939, Green[2] reported the use of ferret-passed "distemperoid" virus as a live virus vaccine for the immunization of dogs and foxes. Another approach to the problem found early workers attempting to propagate the distemper virus in chicken eggs. Only limited success was achieved until Haig[3] reported, in 1948, successful adaptation of Green's ferret-passed distemperoid virus to growth on the chorioallantoic membranes of developing chicken eggs. The egg-adapted virus, designated as the Onderstepoort strain, was propagated in eggs through 30 passages. This virus, when injected into ferrets, caused reactions similar to those induced by the virus prior to egg cultivation. Distemper antiserum neutralized the egg-cultured virus. Three of 13 dogs reacted severely when inoculated with suspensions of the infected membranes and one died after typical symptoms of distemper appeared.

Haig's second report[4] described further subinoculations onto the chorioallantoic membranes of developing chicken eggs over a period of 15 months, during which time the virus was carried through 90 passages. The virus was found to have lost some of its highly contagious characteristic and to have become partly attenuated for ferrets, producing a subacute form of the disease with recovery, rather than death, being the usual result.

Cabasso and Cox[5] successfully grew another strain of distemper virus on the chorioallantoic membranes of chicken embryos. This virus was one which had been isolated from a dog in 1941. They carried the strain through 74 serial passages in eggs and reported that the lethal effect on ferrets was retained through the 24th passage. Between the 24th and 28th passages, the ability to cause distemper in ferrets was lost and thereafter inoculation with the virus was reported to induce a high degree of immunity to subsequent challenge with virulent distemper virus. Cross-neutralization tests were carried out in chicken embryos and in ferrets to prove the immunologic identity of the egg-adapted strain and the original animal-passaged virus.

West and coworkers[6] at the University of Wisconsin, initiated cultivation of several strains of distemper virus on the chorioallantoic membrane of chicken embryos. Their sources of virus were as follows: (1) FXNO strain, spleens from two foxes experimentally

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infected with fox distemper; (2) FRMV strain, isolated from mink and passaged in ferrets; the blood from the third ferret passage was used for the initial inoculum; (3) M29 strain, mouse lung from the 29th passage of the distemper virus in mice; and (4) spleen from the fourth ferret passage of distemperoid virus. The results of this work have not yet been published.

Experimental and field work with rinderpest, rabies, hog cholera, and distemper have shown that living viral agents, attenuated and fixed by serial passage in embryonated eggs or in animals other than the specific hosts, often stimulate more substantial and longer-lasting immunity than do the killed virus tissue vaccines.

In some cases, the rapid development of resistance following vaccination with attenuated live viruses appears to be a result of the blockade of susceptible cells by the attenuated virus against penetration of the fully pathogenic virus. This so-called interference or cell-blockade phenomenon has been observed with many viruses. Green and Stulberg[7] described the inhibition of virulent distemper in foxes by intramuscular inoculation of ferret-passed distemperoid virus as late as 12 days after intranasal instillation of virulent virus. They observed that when the viruses were both given intramuscularly, the distemperoid virus revealed only slight ability to prevent the fatal disease unless given simultaneously with or before the virulent virus.

In the experiment to be reported, ferrets were challenged with a lethal strain of distemper virus at varying times following vaccination with egg-adapted virus to determine how soon they would become resistant to the fatal infection.

Materials and Methods

Egg-adapted Virus. Haig's Onderstepoort strain of egg-adapted distemper virus from the 85th egg passage was used as a vaccine in these experiments. The virus of the 79th passage was received by the authors and the strain has been maintained in this laboratory by occasional passage in eggs. Between passages the material was stored at —76 C.

Preparation of Vaccine. A suspension of membranes infected with the egg-adapted virus was inoculated onto the chorioallantoic membranes of fertile eggs which had been incubated for seven days. After further incubation for seven days, the infected membranes were removed and ground in a Waring blendor with sufficient nutrient broth (difco) to make a 20% suspension. This suspension was distributed into sterile ampoules and sealed. The ampoules were immediately placed in a dry-ice chest for storage until used. A portion of the material was tested for bacteriological sterility and for growth of the virus in embryonated eggs. Bacteria were not found and typical lesions were produced in the inoculated eggs.

At the time the ampoules were thawed for use, a portion of the contents of each ampoule was reserved for inoculation of eggs to determine the viability of the virus. In every case, the material used as experimental vaccine was found to contain viable virus.

Virulent Distemper Virus. Green's ferret-passed distemperoid virus was used as the challenge material in this experiment because of its extreme virulence for the ferret. The distemperoid virus* was obtained in the form of lyophilized, infected, ferret spleen tissue distributed in ampoules containing 37.5 mg. of tissue prior to dehydration. All of the ampoules used in this experiment were from the same lot, labeled as follows: "Green Method, Canine-Distemper Vaccine, Ferret Origin, *Distemperoid*, Serial no. 157KB20, Expiration date April 25, 1952."

Titration of Distemperiod Virus. A preliminary infectivity titration was performed in ferrets using the contents of two ampoules resuspended in 1 cc. each of sterile distilled water, as recommended by the manufacturer. On November 13, 1951, three six-month-old ferrets were inoculated by the intraperitoneal route with 1 cc. each of a 1:10, 1:100, and 1:1000 dilution, respectively, of the distemperoid virus. The ferrets receiving the 1:10 and 1:100 dilutions developed signs of distemper and were killed when moribund 11 and 12 days, respectively, following inoculation. Inclusion bodies characteristic of distemper were demonstrated by the Pollak trichrome stain in the urinary bladders of both animals. The ferret receiving the 1:1000 dilution showed no signs of disease throughout the observation period of 25 days. At the end of this time, this animal was placed in the experimental group and was reinoculated with distemperoid virus on December 10.

Even though the small number of animals used in this preliminary work prevented accurate calculation of the minimum lethal dose, the lethal property of the virus preparation was demonstrated and it was possible to determine a satisfactory dilution of the virus preparation that would cause death of susceptible ferrets.

Animals. Thirty-three ferrets, five to six months of age, were selected from the stock

*Supplied through the courtesy of Fromm Laboratories, Inc., Grafton, Wis.

colony at the Fur Animal Disease Research Laboratory. They were divided into 11 groups of three each and were allowed to remain in their regular individual cages in a ferret shed following vaccination until the day they were inoculated with the virulent virus. At the time of vaccination, however, the pens were separated a distance of about 25 feet from those of the non-vaccinated animals in the shed as a precaution against possible transmission of the live virus that was used as a vaccine, although available evidence[4,5] indicates that the egg-adapted virus is not readily transmitted from one animal to another.

shown in table 1. One group of three ferrets was left unvaccinated as a control. Ferrets were observed once daily following vaccination for signs of reaction to the egg-adapted virus, but none was noticed. However, temperatures of the animals were not taken and mild symptoms may have been overlooked.

Immediately before vaccination and again just before challenge on December 10, the ferrets were bled by cardiac puncture while under ether anesthesia. Those ferrets vaccinated simultaneously with or after challenge and the non-vaccinated controls were bled only once, on December 10. About 2 cc. of blood

TABLE 1. Vaccination of Ferrets with Egg-adapted Distemper Virus

Group No.	No. Ferrets	Date	No. Days Before Challenge	Observations Following Challenge
I	3	11/13/51	27	One ferret died 13 days after challenge, showing typical signs of distemper; others showed no signs of illness.
II	3	11/20/51	20	No signs of distemper; all survived.
III	3	11/24/51	16	No signs of distemper; all survived.
IV	3	11/27/51	13	*One ferret died 21 days after challenge; others showed no signs of illness.
V	3	11/30/51	10	No signs of distemper; all survived.
VI	3	12/3/51	7	No signs of distemper; all survived.
VII	3	12/6/51	4	No signs of distemper; all survived.
VIII	3	12/8/51	2	No signs of distemper; all survived.
IX	3	12/10/51	0	All died 14 days after challenge, showing signs of distemper.
X	3	12/12/51	2 days after	All were killed when moribund 12 days after challenge
XI	4	Non-vaccinated (3 controls and 1 survived from preliminary titration)		One died and the others were killed when moribund 12 days after challenge.

*No evidence of distemper in this ferret.

Experimental

An experiment was designed to determine at what period following vaccination with egg-adapted virus, ferrets might become resistant to virulent distemper virus. It was considered important that all of the ferrets receive an equal challenge with the virulent virus. For this reason, it was decided to vaccinate the different groups of ferrets at varying time intervals and to challenge all of them with distemperoid virus on the same day in order to assure an equal challenge and to facilitate the care and observation of the ferrets after they were inoculated. December 10, 1951, was selected as the challenge date and vaccinations were scheduled accordingly.

Beginning November 13, and at subsequent intervals, groups of three ferrets were vaccinated intramuscularly in a hind leg with 1 cc. each of the egg-adapted virus preparation. The schedule of these vaccinations in relation to the day of infection with distemperoid virus is

was taken each time and the serum was collected for use in serological tests. Adverse effects from the bleeding were not observed.

Following bleeding on December 10, all ferrets were moved, along with the cages in which they were housed, to an isolation unit. Here they were inoculated intraperitoneally with 1 cc. each of a 1:5 dilution of the pooled contents of 10 ampoules of reconstituted distemperoid virus material. The dilution was prepared in cold, sterile, distilled water immediately before inoculation.

The ferrets were observed daily for 31 days following inoculation. Observations are recorded in table 1. At the end of this time, the surviving ferrets were bled again and sacrificed.

As shown in table 1, all of the non-vaccinated ferrets (group XI) and the ferrets that were challenged simultaneously with vaccination (group IX), or two days before vaccination (group X), developed typical signs of distemper, *i.e.*, anorexia, matted eyes, hyper-

emia of the anal region, and severe depression. These animals died or were killed when moribund 12 to 14 days after inoculation. One of the ferrets in group I also succumbed after showing typical signs of distemper. Inclusion bodies characteristic of distemper were demonstrated in sections from the bladders of all of the above ferrets.

One ferret in group IV which was very small and in poor condition at the time it was placed on experiment, died 21 days after challenge. Symptoms of distemper had not been detected. Postmortem examinations revealed a fatty liver, gray swollen kidneys, and free blood in the stomach and small intestine. No bacteria were found in cultures of the heart blood, liver, and kidney. Inclusion bodies were not found in sections from the bladder of this animal.

The remainder of the ferrets, *i.e.*, all those challenged two or more days after vaccination, with the exception of the two deaths described above, failed to develop signs of distemper and appeared to remain in good health until sacrificed January 11, 1952. The bladders were examined for inclusion bodies, but none was found in any of these ferrets.

Discussion

The foregoing experiment affords evidence that the Onderstepoort strain of egg-adapted distemper virus is capable of quickly inducing in ferrets a high degree of resistance to virulent distemper virus. The development of this resistance as early as two days after vaccination with the egg-adapted virus may be a manifestation of the interference phenomenon that has been observed with many other viruses. However, in view of the small number of animals used in this experiment and the wide spacing of vaccinations, it is impossible to draw definite conclusions concerning the nature of resistance in the early stages.

No explanation is offered for the death from distemper of one ferret in group I which was vaccinated 27 days before inoculation with the virulent distemper virus. The death, following reinoculation with distemperoid virus, of the ferret which survived a previous inoculation of a 1:1000 dilution of this virus in the preliminary titration, is in accordance with the reports of Laidlaw and Dunkin[1] who found that the administration of a sub-infective dose of virulent distemper virus does not stimulate any significant degree of resistance in ferrets.

Summary

Thirty-three ferrets were vaccinated with Onderstepoort strain of egg-adapted distemper virus at various intervals before and after inoculation with a virulent ferret-adapted virus.

Those ferrets vaccinated simultaneously with or after the inoculation of distemperoid virus died showing typical signs of distemper.

The ferrets which received the egg-adapted strain of virus two or more days prior to the administration of distemperoid virus did not develop distemper; with the exception of one animal which died after showing typical signs of the disease.

Acknowledgment

The authors wish to express their appreciation to Dr. William E. Ribelin for advice and assistance with this work and to Mr. George C. McGinnis and Mr. Ralph Holte for technical assistance.

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Chinese Insect Therapy

(*Continued from page 462*)

In the Li Chi dynasty one reads that ants, bees, and cicadas were used for food. The sacrificial food dishes had pickled ants' eggs, eaten in the south by tribal chieftains; these insects tasted like pickled meat. The white ant, which is not an ant but a termite, is eaten today by the hill tribes in Burma.

Modern pharmacological analysis and bioassays have proved that the ancient Chinese were right in considering insect dietetics and therapy. The modern 20th century pharmacy still utilizes insect derivatives, galls, wax, honey, and cantharides even today. Science marches on.

Progesterone To Delay Estrum In Bitches

G. H. MURRAY, D.V.M., and E. L. EDEN, JR., D.V.M.,
Pueblo, Colorado

THE presence of estrum in racing, hunting and show bitches often is a most objectionable occurrence to the owner, since during this period these animals cannot be used to fullest advantage. Veterinarians frequently are requested to initiate appropriate therapy that will delay sexual activity in order that females can be used during a certain race meet, hunting season, or show period.

Since manifestation of heat in bitches is due to the increased amounts of estrogen, therapy generally has been directed toward inhibiting the effects of this hormone. The hormones, testosterone and progesterone, probably have been used more than any other type therapeutic agent for this purpose. Dukes[1] states that evidence has been presented which indicates that testosterone is without effect on estrogen, but rather that its apparent antagonism is due to influence on the anterior pituitary gland. Progesterone,[2] the hormone of the corpus luteum, suppresses ovulation and estrum, maintains pregnancy, inhibits uterine contractions, and furthers development of the mammary gland. Both testosterone and progesterone preparations previously used have been oil solutions and aqueous suspensions. These produce a therapeutic effect of short duration. Injections must be repeated frequently. This short action has made therapy impractical and, their use by veterinarians limited. According to some Greyhound owners, testosterone causes slowing of racing time.

Recently, a new hormone preparation, repositol progesterone® was made available for clinical testing as an estrum-delaying agent. Repositol progesterone is a sterile solution containing crystalline hormone material which will precipitate in the tissues following intramuscular injection. The implant is gradually released from the tissues to produce a prolonged systemic effect. Care must be taken to use a dry syringe as moisture will cause the hormone to precipitate in the syringe. Injections must be made deep into muscle tissue to assure maximum effectiveness. The product is stable at room temperature.

®Pitman-Moore Co., Indianapolis, Ind.

Report of Case Histories

Case 1. Two imported Irish Greyhound maidens were brought to the hospital on August 19, 1951. Examination revealed slightly swollen vulvas, indicating the beginning of estrum. Since both females were racing, the owner was anxious to have them treated. Each dog was given an intramuscular injection of 50 mg. of repositol progesterone. An examination five days later revealed evidence of return to anestrum. Injections were repeated on August 29, 1951. Neither dog missed a racing date, nor was their racing time lowered as a result of the therapy while at the Pueblo track. Six weeks after the second injection and while competing at Phoenix, both dogs became slower. By the latter part of November, both showed typical signs of heat.

Case 2. An imported Irish Greyhound bitch in season February 10, 1951, was presented August 15, 1951. Examination revealed vulvar enlargement. Therapy was requested to delay estrum for duration of the race meet. Two intramuscular injections of 50 mg. repositol progesterone were administered at 14-day intervals. Manifestations of heat were suppressed to apparent anestrum. Three months later, while on the Phoenix track, this dog faded markedly, dropping from the feature race down to the daily-double competition. She was in season on November 28, 1951.

Case 3. Three Greyhound litter-mate bitches were presented August 21, 1951, with a history of having been in season, in February 1951. The owner requested treatment to prevent estrum, so that these dogs would continue racing at top form. Each animal was given an injection of 50 mg. repositol progesterone. One bitch exhibited typical estral signs the latter part of November. The other two animals were racing at last report, February 5, 1952.

Case 4. A five-year old English Bulldog was presented with the history of having had a litter of pups semi-annually for the past 3½ years. She was due in season about February 1. On January 15, 1952, 50 mg. of repositol progesterone were administered. On January 29, examination revealed slight evidence of heat. At that time 75 mg. were injected.

Routine, periodic examinations did not reveal estral signs, up to April 15.

Case 5. A seven-year-old Boxer female, due in season approximately March 15, was presented for treatment on March 3. A dose of 75 mg. repositol progesterone was administered. On March 17 and 28, dose was repeated. Estrum first appeared on June 15, 1952, at which time all normal manifestations were observed.

Comment

The results obtained in these few cases indicate that this type hormone therapy can be used easily and safely by veterinarians to prevent the occurrence of the physiological condition that frequently inconveniences dog owners. It is important to initiate therapy prior to the onset of external signs of estrum. Fortunately, many dog owners can closely estimate the expected date of heat. Fortified with this information, treatment can be started at the most advantageous time. It is reasonable to expect that dosage of progesterone may vary from case to case, but in this study a dose of 1 to 1.5 mg. per lb. body weight accomplished the desired effect. It is possible that by repeating the injection at two- to three-week intervals, estral symptoms can be delayed as long as therapy is continued.

It is impossible to forecast time of recurrence of the normal cycle in treated animals. Obviously, the amount of the hormone used, and the number of injections given, must be considered. It is of interest to note that several of the patients mentioned in this report exhibited estrum approximately three months following the last injection. Majority of cases were injected in the musculature of the hind legs, which is the preferred site. Interestingly enough, the only toxicity noted with this preparation has been when certain Greyhound owners have insisted on the injections being given in the cervical region. Evidence of soreness has been observed following some injections at this site, apparently hindering action. The writers are not aware of any data indicating that this type of therapy is detrimental. Animals previously treated breed and will deliver normal puppies.

As is usually the case in such a clinical report, many animals are injected though results of treatment cannot be obtained for various reasons. The majority of Greyhound bitches that were injected could not be reported in this study, as they were moved from the Pueblo area to other sections of the country at the termination of the race meet. At the time this paper was submitted to the publishers, the writers were busily engaged in treating large numbers of Greyhounds. It is evident that dog owners feel that this clinical trial has proved the effectiveness of the preparation.

Summary

The clinical use of a new hormone preparation, repositol progesterone, to delay estrum in bitches, is described. When injected intramuscularly, it forms a type of implant producing the desired, delaying effect, for a protracted period without evidence of toxicity. A dose of 1 to 1.5 mg. per lb. body weight repeated at two- to three-week intervals is recommended.

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Milk Sanitation

The civil defense aspects of milk sanitation are discussed in a recent article by Dr. Martin Baum, former veterinary medical consultant to the Federal Civil Defense Administration, and at present director of veterinary public health, Colorado State Health Department. Doctor Baum points out that milk is one of the most perishable food commodities, and hence, highly susceptible to contamination and adulteration. He urges that the milk industry create a disaster control committee to meet any emergencies that may arise, and enumerates the problems.

The training of auxiliary sanitation personnel to supplement the official agencies' staffs is one of the most important tasks of milk sanitarians and should be inaugurated without delay, according to the author. A manual has been prepared for the Civil Defense Administration on milk and food sanitation, which will be valuable to those who are responsible for planning and training.

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(*Continued from page 458*)

5, N. Y., or any local CARE address, will help provide the respirators as "A gift from the American people." Should an organization or individual donate the complete cost of a respirator, delivery will be made in the name of the donor. The new program is approved by the U. S. State Department's Advisory Committee on Voluntary Foreign Aid.

My Professional Responsibility To My Clients†

JAMES H. ROSENBERGER, B.S., M.S., D.V.M., Clinton, Wisconsin

"TO be faithful and zealous, preventing needless loss to those I am called upon to serve" —

Thus reads The Veterinarian's Creed, with regard to professional responsibility to the client. Is that enough? Does our responsibility to the client stop with the prevention of needless loss to those we are called upon to serve?

In his presidential address before the Atlantic City meeting of the American Animal Hospital Association last May, Dr. J. Raymond Currey had this to add: "This assembly of small animal practitioners is unique in that we are charged with a grave responsibility over and above our large animal counterpart. Our patients are an integral part of American life. Therefore, consistent understanding of client and patient problems is essential in establishing reputations of confidence and trust. It would be difficult ever to evaluate the close bond between patient and family. With illness of the family pet, concern mounts high and may even interfere with the client's business or domestic tranquility. It should be remembered that our intrinsic success can be measured in that degree of confidence which the public expresses in our sympathetic understanding of their problem—our integrity and professional capacity."

Responsibilities we might have to our patients are in most cases adequately stimulated by equal measures of personal professional pride and the almighty dollar. It would be most difficult for any veterinarian to deny the satisfaction he feels in effecting a cure for Mrs. Jones' dog which, "has been to every other vet in town." Likewise, it is almost axiomatic that successful treatment directly influences yearly income.

What of our professional responsibilities to our colleagues? It is unlikely that any of us would wilfully endanger his own reputation, great or small as it might be, by neglecting common courtesies. If there can be any one motivation singled out as the key to the professional crusade which veterinary medicine began little more than a decade ago, it was the response to one of Abraham Lincoln's greatest truths, "United we stand, divided we fall." The American Animal Hospital Association stands as a national symbol of this union. It exists because a group of veterinarians realized their responsibilities to one another and in that realization found greater strength. We need have no fear that companionate responsibility will go untended. It represents the purest form of democratic activity and as long as the individual can gain by collective effort in any endeavor, it shall prosper.

The veterinarian is thus motivated by egoism and economic law in his dutiful relationships with his patient and his colleague. If there is any flaw in his ethical progress, it lies in his attendance to client responsibility. In what way should a veterinarian be responsible to his client? In the ethical sense, he should be morally inviolate. In the legal sense, he should be completely accountable. In the professional sense, he should be both; ethical in his attitude and accountable in his action. This is not to say that there exists any great inadequacy in our professional personality. Rather, there is ample evidence to the contrary. As a group, veterinarians are well aware of the value of good client relationship and daily practice it as a valuable adjuvant to their professional skill. The point is this; to have a good client relationship one must also cultivate a sense of client responsibility. This is particularly the case in the practice of small animal medicine. The almost parent-child relationship which exists in many cases between a client and pet cannot be taken lightly. It puts the practitioner very nearly in the shoes of the pediatrician and often taxes the veterinarian's diplomacy considerably more than it does his professional skill. Indeed, at times one is sorely tried to keep from prescribing treatment for the client, knowing full well that therein lies the animal's chief affliction. To defend this situation adequately as a part of our professional responsibility to the client would be a most difficult task. Suffice it to say that it is an existent problem and one that must be dealt with.

The author's only solace is a few lines of verse:

"Don't do right unwillingly,
And stop to plan and measure,

†Presented at the 19th annual meeting American Animal Hospital Association, Apr. 30-May 3, 1952, Pasadena, Calif. See page 473.

'Tis working with the heart and soul,
That makes our duty pleasure"

That is little enough to soothe the fevered brow after a half-hour's telephone conversation about Fifi's sinusitis, but nevertheless the advice is good. As some sage has said, "What must be done, is easier done if done willingly."

Having thus, in a measure, discharged one's moral responsibility to the client with a psychosomatic approach toward the alleviation of any false fears and the preparation of a true picture of the situation as we see it, we are faced with the more material aspects of our client responsibility. I am certain McFee had this in mind when he said, "Responsibility's like a string we can only see the middle of. Both ends are out of sight." Indeed, such is the case in the matter of fees. On one hand we occasionally see the practitioner, so distracted by the incessant queries of the misdirected hypochondriac on the other end of a dog leash that he raises his fees in an effort to discourage further patronage; only to find all too late that he has brought a veritable horde of Fifis to his door, the result of having overlooked the fact that some clients divine no difference between a bill and ability. At the other end of that string of responsibility is the practitioner with empty cages, the victim of the opposite premise, undercharging his services and thus undermining his reputation. Of course, those are extremes and do not apply to the majority, but the important point is that as a profession we should not bastardize our ethical standards by taking advantage of human frailities. There are those quick enough to cry charlatan in their ignorance of our professional position without our making their cries ring true by emulating the antics of the so-called Park Avenue physician. Nowhere else is that near parable "Let your conscience be your guide" so fittingly applied.

We are striving, and must continue to strive, toward the ethical standardization of our services, both morally and economically. In that way, and in that way alone, can we, as individuals, insure the continued growth of our profession as a basic medical science. So long as any field of endeavor is besmirched with individuals whose face values do not match their dollar values, it will never attain its true potentialities.

It takes no great amount of consideration to realize that the veterinarian specializing in small animal practice occupies a unique position with regard to influencing professional developments. The limitations of his service are not so strictly bound by the economics of animal value as are his large animal colleagues. His methods of treatment are, by the nature of the great majority of his patients, more closely aligned with the technics of the human medical practitioner. This combination of a degree of economic freedom in the expense of treatment, combined with a wider range of applicable medical technics, quite naturally and necessarily nominates this group to the office of professional leadership. Along with the increased benefits of this more definitive professional position, both monetarily and environmentally, come also added responsibilities. The very nature of the small animal practitioner's professional activities preconceives the increased possibilities of unethical opportunities, particularly in the realm of client relationship. The psychological advantage which he enjoys over the average, naturally distraught client is not equally shared by the large animal practitioner; who is, in fact, often faced with an economic appraisal even before his professional advice is requested.

If then, this great responsibility of professional leadership is to be successfully discharged, the members of organizations such as the American Animal Hospital Association must take complete cognizance of their position. They must continue to strive toward a uniformly ethical client relationship. The professional progress of veterinary medicine can be enhanced immeasurably by their concerted effort.

Let us remember that the renaissance of our profession has up to now largely ridden the waves of a turbulent economic expansion. If we do not wish to find ourselves becalmed on the sea of devaluation when the storm breaks, let us strive now to fix our course on the star of ethical professionalism. It represents the only safe way to our desired destination.

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Western Equine Encephalomyelitis

The California Department of Public Health has reported over 600 cases of human western equine encephalomyelitis during the summer of 1952. About one-third of these have been confirmed by their laboratory. There have been 33 deaths. The most serious cases have occurred in very young children. In one community six children out of 25 stricken have evidence of permanent brain damage. There have been 260 horse cases reported. The epidemic has been largely confined to the Central Valley of California.

EDITORIAL COMMENTS

"Watch and Report"

Consciousness of the problem of defense against biological warfare is vital to national existence. Knowledge of its scope and the possibilities it offers a ruthless enemy is preparation against it.

Defense may be said to be merely intensification of standard operating procedures of livestock sanitation. Actually its scope goes beyond these bounds. Producers and all others who have daily and constant contact with stock must be alert to the unusual or unexpected.

The subject of this, as well as all matters of civilian defense, will find ready listeners. Encourage all to "watch and report" livestock disease symptoms promptly.

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Inequality of Entrance Rank and Pay for Veterinarians

It is a matter of concern to all segments of the veterinary profession that entrance rank of graduates in the Armed Forces is not on an equal basis with other medical professions. The reasons for the requirements that a graduate veterinarian must serve for one year as a 2nd Lieutenant no longer exist.

There are at present, approximately 33 officers in the grade of 2nd Lieutenant on active duty in the Veterinary Corps. This group is about equally divided between the Army and Air Force.

There has been published (*Jour. Am. Vet. Med. Assn.*, 120:320 [May], 1952) the names of members of the Armed Services Committees in the House of Representatives and the Senate. Any effort to bring this inequality to the attention of these law-makers can be expected to be rewarded by correction of discriminating legislation contained in both the Officer Personnel Act of 1945 and the Career Compensation Act of 1949.

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Identification of cattle by noseprinting may be a practical method, according to workers at the South Dakota Agricultural Experiment Station.

The *New England Dairyman* reports that a classification system has been developed with assistance of fingerprinting experts of the Federal Bureau of Investigation.

Progress in Vesicular Exanthema Control

Recent press release of the USDA has announced the establishment of quarantines in parts of five states. Since the middle of June, infection has appeared in 25 states, exclusive of California from whence the disease spread.

Pulaski County, Arkansas was placed under quarantine when the disease was identified in a garbage-feeding establishment near Little Rock. Quarantine measures were imposed in parts of Dakota County, Minnesota because of infection in swine originating from the South St. Paul Stockyards. Other notices of quarantine and removal of restrictions indicate progress in control. Approximately 45,000 animals have been disposed of by slaughter of an estimated 75,000 head in infected herds in all states except New Jersey and California.

The Nebraska legislature has passed a law, effective after a 90-day waiting period, requiring that all garbage must be cooked before it is fed to hogs in that state. This will eliminate the danger of virus in raw pork scraps from carcasses that have passed inspection, yet harbor the virus. It appears reasonable to suspect that the latest outbreaks may have resulted from virus laden fresh or frozen pork scraps in the feed. Similar outbreaks in garbage-feeding lots can be expected in later months.

Action was taken by livestock officials in Canada early in September which imposed a strict ban on imports from United States of swine and pork products. Kansas officials announced a scheme for the annual registration of all garbage feeders in that state. Simultaneously, restrictions were placed on the movement and sale of garbage-fed hogs. It was also announced that no indemnities will be paid on hogs that develop any infectious or contagious disease, after being fed garbage or packinghouse refuse.

These and other moves toward control and eradication are directed toward the basic source of infection—garbage containing raw pork.

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Late Virus Treatment

If hog cholera antiserum alone is administered to hogs, successful immunity to cholera may be induced by the injection of a regular dose of virus between the seventh and ninth days after serum treatment.

Practice of Veterinary Medicine

(From report of the Missouri State Board of Agriculture—1898)

A law should be enacted regulating veterinary practice. Graduates of reputable colleges who have carefully studied this science, who have invested their money and given their best thought to the improvement of livestock sanitary conditions should be protected from competition of the ignorant and unscrupulous fake.

It is true that all non-graduates are not of this class. Some of them are good citizens, possessed of sound judgment and have picked up some knowledge of veterinary medicine. But there is no reason why these men, by a certain time to be fixed in the law, should not have taken a regular course and fitted themselves for a more profitable practice and more satisfactory and intelligent service to the public.

Missouri with an annual output of more than $100,000,000. worth of cattle, hogs, horses and a value probably in excess of this left on the farms, will employ a largely increased number of veterinarians when the science is brought into popular favor more generally among the people than now.

But the old horse doctor who doses an animal with the same remedy without regard to the character of the disease; the cow doctor who treats cattle for hollow-horn and hollow-tail, and makes quids out of dish-rags, will not command the confidence and respect of the intelligent livestock breeder nor serve his interests with profit.

These men, if permitted to advertise as veterinarians and to inflict their services upon a public, generally unable to discriminate between scientific attainment and fraudulent pretense, will bring your profession into disrepute; limit the demand for your services; reduce your fees below proper remuneration; confuse the public mind as to your skill and knowledge, and prove a hindrance to the full development of veterinary science.

This law should be broad and liberal and practical in application, and should require no cumbersome nor intricate means of enforcement.

It needs only a plain, simple declaration recognizing the skill of the graduate of a reputable veterinary college and regulating his practice, and after a reasonable time prohibiting others, and fixing penalties for a violation of the statute.

Do not expect to have such a law enacted by preparing a bill and sending a copy to your representative with a request that he introduce it. This action will not secure favorable legislation, notwithstanding your bill may possess the highest order of merit. Legislators are busy men, at least such is the case with those who are familiar with legislative work and could be of service to you. They have a large correspondence with their constituents, are looking after other important bills, and counseled by other representatives and state officers, and continually followed by the irrepressible lobbyist.

Let your Association at its next annual meeting agree upon desired legislation, and then appoint a committee that will draft the bill and will remain in Jefferson City during the session of the legislature until it is enacted into a law.

And while we are considering such action as will advance the best interests of, and elevate your profession, you men, graduates of the best schools, must remember that much depends upon you. Your skill, your high character for honesty and integrity and fair and candid dealing with your patrons and earnest application to the duties of your profession will soon win the confidence of livestock breeders and do much toward bringing your profession into popular favor and making your practice remunerative and profitable, and secure for you the necessary recognition under the statutes of the state.

But veterinary science is not today what it was yesterday. Then it was an improvement upon the country horse doctor, but since has advanced by leaps and bounds, and today is an important science, and in the profession embraces some of the best men, and best thought of this or any other country. Only he who carefully notes this advancement, who by the aid of approved veterinary literature keeps in touch with this progress, and notes the achievements of the present can hope to succeed.

I predict for your profession a bright and interesting future. Diseases of livestock that are transmissible to the human family are rapidly on the increase. It may, in the near future, be settled beyond question that other livestock diseases now thought to be harmless are injurious to the human race.

To make these investigations, to learn the means by which infection spreads and how to arrest it, to control and extirpate contagious disease and many other matters of vital importance to the human family and to our livestock interests is the work of veterinary science. It is your profession that must warn and protect the public from unhealthful dairy

products and diseased meats. From you should come the information that will enable legislatures to enact safe and prudent statutes for the protection of our people against these contagious diseases. Great is your responsibility and let your work answer as to how well you have administered your trust.

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Intraperitoneal Injection in Cattle

The preferred site for intraperitoneal injection is the upper and posterior portion of the right paralumbar fossa near the angle formed by the lateral processes of the lumbar vertebrae and the anterior margin of the internal oblique abdominal muscle, or slightly ventral and anterior to the point of the hip. Recommended needle is 16 gauge having a tube length of from 2 to 3 in. Point should have a short bevel, similar to spinal needle, and should be inserted upward and backward through the abdominal wall. — *George R. Fowler, D.V.M.*

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Mycotic Stomatitis

Administration of antihistamines gives dependable results in the treatment of mycotic stomatitis in cattle. Repeat dose in eight hours as indicated, particularly when laminitis is a symptom. Mouth lesions should be treated with tincture of iodine, 5% solution of potassium permanganate, or other antiseptic.— *E. F. Ebert, D.V.M.*

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Epidural injection of 6 cc. of 90 proof alcohol has effectively controlled persistent eversion of the vagina in cattle in my practice.—*C. W. Schulz, D.V.M.*

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Lack of trained personnel and adequate equipment are the primary limiting factors of the best surgical technic.—*J. P. Carney, D.V.M.*

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It may be a matter of interest to graduate veterinarians of 1935 and before that time that BAI tuberculin has, since that time, been prepared from human strains of the tuberculosis organism, and that tuberculin so prepared and derived has been and is now used in the tuberculosis eradication program in the United States. In foreign countries, tuberculin is prepared from human, avian, or bovine strains.

Moss Essay Contest Winner

Each year senior students of veterinary medicine are invited by the American Animal Hospital Association to submit an essay on the general topic of ethics. As a result, increasing numbers of papers are submitted in the Moss Essay Contest, named for its originator, Dr. Lloyd C. Moss of Colorado.

Doctor Moss's experiences convinced him that graduate veterinarians received too little formal training in matters concerning general conduct. He encouraged the A.A.H.A. to

Dr. James H. Rosenberger

assist him in directing the attention of young men to ethical matters and proposed the present annual contest. The first (1945) was financed personally by Doctor Moss, but since has been a featured activity underwritten by the Association. Annually, cash awards are given winning students from each school, with an all-expense-paid trip to the annual convention for the grand prize winner.

Past winners of the Moss Essay Contest are:

1945 Dr. P. R. Brown (Cornell), now in general practice at Belfast, Me.

1947 Dr. William S. Carr (Ohio State University), now in general practice at Claypool, Ind.

1948 Dr. George M. Smith (Ohio State University), now in general practice at Greenville, S. Car.

1949 Dr. Peter Olsen (Colorado A. & M.), now in small animal practice at Skokie, Ill.

1950 Dr. Gail E. Hawley (Michigan State College), now in general practice at Glendive, Mont.

1951 Dr. Worth Lanier (Alabama Polytechnic Institute), now in general practice at York, S. Car.

This past year (1952), the winning entry

was submitted by Dr. James H. Rosenberger (he won third prize in 1951), graduate of the College of Veterinary Medicine, Ohio State University, Columbus, in June 1952, and is published on page 469. Doctor Rosenberger was born in Cleveland, Ohio, in 1925, the son of a physician, and received his precollege schooling in that city. He served in the Navy V-12 training program at Yale University and in the Pacific Theater aboard a minesweeper. He entered Ohio State College of Agriculture in 1946 and graduated in 1948 with a major in dairy husbandry. In the fall semester (1948) he matriculated in the College of Veterinary Medicine. During summer sessions of the veterinary school, he earned a Master's Degree in agriculture. While in school, Doctor Rosenberger was president of the student A.V.M.A. chapter and won the Borden award. He is now in general practice, associated with Dr. James Welch of Clinton, Wis.

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Incidence of Anthrax

Thirteen states reported 46 outbreaks of anthrax involving swine, cattle, and sheep during August 1952. Most of these were confirmed by laboratory examination. Losses totaled 160 head.

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Animal nutritionists startled livestock owners a few years ago by announcing that when certain antibiotics were added to animal feeds, the response was increased and more rapid weight gains resulted. Now, from various research agencies there is filtering the information that the addition of certain wetting agents to the animal feed will give comparable results to those obtained from the addition of antibiotics, and the cost of the wetting agents or detergents is much lower than for antibiotics. The only hypothesis advanced for this alleged favorable feeding effect of detergents is that they reduce surface tension. They are wetting agents (some antibiotics also reduce surface tension) and, therefore, make it easier for the animal to absorb the nutrients in the digested feed.

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The Mexico-United States Commission for the Eradication of Foot-and-Mouth Disease has organized 9,364 vigilante committees of 170,777 Mexicans throughout the country to report sick animals to Commission personnel.—*Fed. Vet.*

Southern Veterinary Medical Association

The Southern Veterinary Medical Association will hold its 35th annual convention at Jackson, Miss. The dates are November 17-19, 1952. Headquarters will be the Heidelberg Hotel.

Dr. F. M. Kearns, president, Southern Veterinary Medical Association.

At this meeting, Dr. F. M. Kearns, Louisville, Ky., will preside. A full program for three days will feature national authorities who will discuss current problems of especial interest to veterinarians throughout the South. Honor guest for the occasion will be Dr. W. L. Boyd, president of the A.V.M.A., who will address the meeting on the activities of the national association. He will also contribute to the technical program.

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Dogs in "Get-Out-The-Vote" Campaign

Thousands of dogs throughout the country are enlisted in a "get-out-the-vote" crusade inaugurated by the makers of Gaines dog foods in support of efforts of various civic groups. The owner of each enlisted dog has expressed willingness to parade his pet in public places in his locality while adorned with poster-type, nonpartisan messages such as "Be Freedom's Watch-Dog—VOTE Nov. 4th" and "Vote As You Dog-Gone Please—But VOTE!"

When Gaines offered to dog-owners a "get-out-the-vote" blanket imprinted with these messages for use in the civic campaign the response was so great that the supply was exhausted within a few days of the offer's publication.

PRINCIPLES OF ANIMAL HEALTH

R. R. DYKSTRA, D.V.M.
Manhattan, Kansas

Q Fever a Challenge

In regard to Q fever (it is indicated Q stands for query or, in man, the disease is also known as Balkan grippe) a 1951 publication of the World Health Organization reports that its etiological factor, the rickettsia *Coxiella burnetii*, is contained in the placentas and milk of infected cattle, sheep, and goats, and that these animals are the chief source of human infection, especially if milk contains the rickettsial microorganism and it is consumed in a raw state. It is indicated that many of the etiological organisms may survive a pasteurization temperature of 61 C. for 30 minutes. "At the present time, the principal means of transmission to man seems to be via the air-borne route." It is stated that Q fever in man is a world-wide endemic disease, and since domesticated animals are of fundamental importance in its transmission, there should be clarification of the entire problem.

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Antibiotics in Swine Rations

With due regard for appropriate sanitation and a well balanced ration, the addition of 10 gm. per ton of feed—approximately 5 mg. per lb.—of antibiotics in swine rations appears to have considerable value. The antibiotics most frequently reported on are penicillin, streptomycin and terramycin. Reports indicate that in outwardly healthy pigs, the growth rate between weaning and market time may be increased from 15 to 20%, and in runty pigs, the weight increase may be as much as 100%. The belief among research workers regarding the mode of action of the antibiotics is that any one of them has an inhibiting effect on subclinical pathogens. No value is attached to the use of antibiotic-enriched feeds in the prevention of acute infections.

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In a Secretary's Report of a veterinary association meeting held in 1892, it was stated that a veterinarian delivered a paper on An Interesting Case of Artificial Impregnation, in which, among other things, was noted "the semen was caught in a receptacle, mixed with warm milk, and by means of a small rubber tube and funnel was forced into the uterus—the mare was impregnated."

Anthrax in Man

Anthrax in man, though a comparatively rare disease—the U. S. Public Health Service reports on 508 cases of it during the period 1944-1951—is always a threat, especially to veterinarians and others handling animals and their products. So-called wool-sorter's disease is an example, as well as malignant carbuncle. A highly fatal form of the disease in man is the lung infection following the inhalation of spores from hair or wool undergoing processing. It is generally observed that the excellence of meat inspection in the United States, together with the rareness of anthrax bacilli in the milk secretion, offer safety to man from the ingestion standpoint. Also in the treatment of man, penicillin and some other antibiotics, with antiserum, seem to be quite effective.

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Science for the Farmer, December 1951, Pennsylvania State College, in an article entitled, Aureomycin Oblets Suppress Outbreaks of Scours in Dairy Calves, states as follows: " . . . Aureomycin oblets are tablets made especially for a different type of clinical case but seem to have particular usefulness in treating scours."

Scours had been very prevalent during December 1950 and January 1951. Starting on January 21, 1951, aureomycin oblets were put on trial for the prevention and cure of calf scours. "Sixty-seven calves were born during the next seven months and each calf was given a 500 mg. oblet within a few hours after birth. Only one calf of this group died of scours and this animal was weak and weighed only 35 lb. when born. Forty of the 67 calves did not develop scours while they were in the herd; bulls are sold from this herd at all ages. An additional 21 calves developed scours once and responded to a single oral treatment. Two calves required two oral treatments and one was given three. The other three calves in this group of 67 received other treatment. Excluding the calf which died, diarrhea was the only symptom shown. The other calves continued to take their full allowance of milk and did not become dehydrated or depressed." No setback was observed in this group of calves.

PUBLIC HEALTH

JAMES H. STEELE, D.V.M., M.P.H.
Atlanta, Georgia

Leptospirosis

Leptospira pomona has been diagnosed in packinghouse workers for the first time in the United States by the Virginia health authorities. Another case has been reported by Dr. Wesley Spink of the University of Minnesota. The diagnosis in both cases was confirmed by the Communicable Disease Center. Previously the disease has been reported in man in Texas, Georgia, and Alabama. With the increasing prevalence of *L. pomona* infection in cattle and swine, a new public health problem has appeared. Infection is common in animal handlers and packinghouse workers in other parts of the world. In Pomona, Australia, a community near Brisbane, where it was first reported in 1937, it is the cause of a "seven-day fever" among dairy farmers. Gsell proved that "swineherds' disease" is due to *L. pomona*. The disease is common in Yugoslavia.

Symptoms of the illness described in Australia are fever, aching and swelling of the joints, skin rash, and eye complications. In Switzerland, meningitis is common. The disease clinically resembles poliomyelitis. Fever usually lasts seven to ten days. Icterus is present occasionally. Gsell records complications such as iridocyclitis, myelitis with paralysis of the bladder and large intestine, encephalitis, orchitis, bronchitis, pleuritis, and in serious cases, myocarditis.

The two packinghouse workers observed in the United States were both thought to have brucellosis by the attending physicians, and considerable time was spent in attempting to prove that diagnosis. The Virginia case was ill for six months with fever, headache, muscle and joint pain, general malaise, and weakness. The Minnesota case had an onset of pains in the back, arms, shoulders, and joints. This was followed by chills, fever, weakness, and profuse sweats. The next day he had a severe headache, temperature of 104 F. followed by vomiting and abdominal cramps. These symptoms persisted for five days. Tests for brucellosis were negative. The patient was afebrile for the next 48 hours. This was followed by a rise in temperature, headache, and evidence of meningitis on the eighth day of illness. Shortly after the meningeal irritation, the patient recovered and returned to work.

Recent studies by veterinary and public health investigators indicate that other Leptospira species in addition to *L. pomona, L. canicola,* and *L. icterohaemorrhagiae* may be present in the United States. Major Gochenour of the Army Medical School has reported the causal agent of Fort Bragg fever as *L. autumnalis,* which had previously only been reported in the Far East. Outside of the continental United States, *L. bataviae* has been isolated in Puerto Rico. This organism was first isolated in the East Indies and later in Africa and Europe, but until recently it was unknown in the western hemisphere.

It is difficult to explain the appearance of disease in new areas. One can say it has been present always, but it was not recognized, or that it was introduced by a carrier. Sometimes these hypotheses can be proved, but most of the time no conclusions can be reached except to realize that disease agents are dynamic and that preventive medicine cannot afford to rest on its laurels.

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Public Health Veterinarians

A recent breakdown of the American Public Health Association membership by profession is as follows:

PROFESSION	PER CENT
Physician	35.5
Nurse	14.7
Engineer	7.4
Sanitarian	4.1
Veterinarian	1.5
Statistician	3.9
Health Educator	7.3
Nutritionist	2.3
Laboratorian	9.3
Dentist	2.4
Other	10.1
Citizen	0.2
Unknown	1.3
	100.0

Veterinarians are the smallest group listed. There are probably three to four times as many veterinarians in full-time public health work, and as many more in part-time public health work who are interested in veterinary public health. At present there are about 250 veterinarians who are members or fellows of the American Public Health Association.

VETERINARY PARASITOLOGY

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Beltsville, Maryland

Some Advantages of Sheep Parasite Control with Phenothiazine

In a controlled experiment by a British worker,[7] better weight gains of lambs and fewer cases of blowfly strike resulted from the preventive use of phenothiazine. Ten days before the start of lambing 30-gm. doses of phenothiazine were given to 19 ewes, and daily thereafter for nine weeks the ewes were provided with 1 to 1.5 gm. each in food concentrate. No phenothiazine was given to 18 control ewes from the same flock. The number of lambs reared to two weeks of age was the same for both groups, 25 in each, and their average weights remained about the same for some 14 weeks. By 24 weeks, however, there were 23 lambs in the treated group and 22 in the untreated, and the former averaged 7 lb. heavier. There were six tail strikes and one body strike among the lambs of the undosed ewes, and only one body strike among the lambs of the dosed ewes. Comparing weight gains of the struck and unstruck lambs of the undosed group, it was noted that the latter gained significantly more weight. At the conclusion of the experiment, 12 of the 23 lambs in the dosed group weighed over 80 lb. as compared with only five such lambs among the 22 of the other group.

Egg-production by internal parasites was higher in the untreated group. The fact was emphasized also that pastures were only moderately good, and the data show clearly that the controls were exposed to only moderate parasitism. On better pasture, and with greater exposure to parasitism, the results presumably would have been more strikingly in favor of the parasite-control regimen.

While the regimen of the experiment was novel, one cannot but note with surprise an implication of novelty in "prevention rather than cure" as the "logical approach to the control of gastrointestinal nematodes in lambs."

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Control of hog cholera depends upon (1) restriction on the distribution of commercial virus, (2) quarantine of sick animals, (3) pasteurization of garbage.—*W. A. Aikens, D.V.M.*

[7]Leiper, J. W. G., A New Approach to Phenothiazine Therapy in Sheep. *Vet. Rec.*, 63:885, 1951.

The Annual Report, 1950-51, Animal Research Division, New Zealand Department of Agriculture, cites instances of apparent failure of phenothiazine against ovine trichostrongyles. The hypothesis of phenothiazine-resistance was tested by seemingly adequate experimentation, but the results were inconclusive. One trial with 20 sheep, which involved testing the drug against infections that had been built up from the few worms that survived treatment in several successive host-passages, yielded results that were slightly significant, but another trial, using 56 animals, showed no difference between the selected and unselected strains.

On the basis of other work, the Report notes that newborn lambs possess no antibodies against stomach worms and trichostrongyles, but that these are present in the colostrum and transferred during suckling. Emphasizing the necessity of frequent replenishing of gammexane sheep dips, reductions from 17 to 44% in concentration of active ingredient were observed to occur when successive dippings had removed 200 gallons from a 900 gallon tank. In dogs, a proprietary teniacide containing diphenthane-70 was found to be inferior to arecoline in efficacy.

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Studies at the Alabama Agricultural Experiment Station[8] have shown that breeds of chickens differ in susceptibility to coccidiosis. Of four common breeds, White Leghorns were the most susceptible and New Hampshires the least. Moreover, by selection through four generations, a comparatively resistant strain of Single Comb White Leghorns was produced. The data pertain to both the cecal and the intestinal forms of the disease.

Other studies at the same Station[9] have revealed that at least one species of common mosquitoes (*Culex quinquefasciatus*) has a high preference for avian blood and that mosquito populations may sometimes reach high enough proportions to cause considerable losses to the poultry industry. Experimentally, using the species aforementioned, the effects of mosquitoes were sufficient to cause a drop in egg production of layers and retarded growth in chicks.

[8]Edgar, S. A., *et al.*, Control of Avian Coccidiosis through Breeding or Immunization. *Poultry Sci.*, (Abs.) 30:911, 1951.

[9]*Ibid*, Feeding Habits of Mosquitoes and their Effects on Poultry.

POULTRY PRACTICE PROBLEMS

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Frederick, Maryland

Prevention of Mating Injuries in Turkeys

Severe losses may occur in turkey breeding flocks because of the females' backs being torn by the male during the mating process. (Figure 1). Once a female is torn, it seldom recovers sufficiently to produce fertile eggs during the remainder of the season. A number of methods have been suggested for prevention of such injuries but the most efficient one consists in the use of a canvas blanket for each female in the flock. Such a canvas "saddle" in place on a turkey hen is illustrated in figure 2.

Fig. 1. Turkey hen with a severe laceration caused by a male during the mating process.

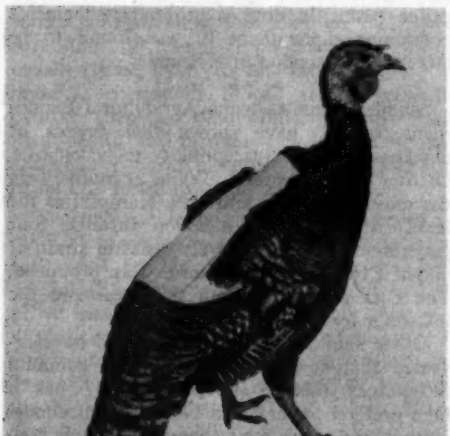

Fig. 2. Turkey hen with saddle in place.

These saddles can be purchased from a number of poultry supply dealers. They are made in one piece with strapped loops which fit over the wings. If a saddle is properly made and fitted correctly to the hen, it will cause no inconvenience, and may be left on the bird for an entire season. At the end of the season, the saddles can be washed, sterilized, dried and stored for use the next season. Properly constructed saddles will last several seasons.

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Blood spots in eggs are more easily detected by candling several days after they are laid according to Jensen *et al.*, (*Poultry Sci.*, 30:919, 1951). They found a definite increase in the percentage of blood spots at a second candling three to seven days after laying as compared to the first candling one day after laying. A single candling at one day was most effective in eggs laid in summer and least effective in winter-laid eggs.

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It requires an average of from four to five pounds of feed to produce one pound of gain in a turkey. The type of ration fed, the quality of the stock and the amount of green feed available, all influence this feed-gain ratio. As the turkey grows older, the ratio becomes greater, and at seven months of age, it requires as much as ten to 12 pounds of feed to produce one pound of meat.

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The only natural sources of vitamin B_{12} for feedstuffs are those obtained from animals. Grain, grain products and vegetables supply only trace amounts. Meat scraps and fish meal can be used to supply a portion of the needs of chickens for this vitamin.

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It is not necessary nor desirable to starve chickens or turkeys longer than three or four hours before killing. Longer starving periods result in excessive body weight loss, without appreciable difference in crop and intestinal content evacuation.

ABSTRACTS OF LITERATURE

Fluorosis in Cattle

Diseases resulting from industrial contamination of forage has concerned numerous investigators in this and other countries. Fluorine poisoning, fluorosis, has only recently attracted attention and the report[19] of examination of a number of herds in the Columbia River Valley details symptoms of chronic fluorosis resulting from pasture contamination in the vicinity of an aluminum plant.

Atmospheric contamination has been demonstrated to be more toxic than fluorine in solid form, as in feed supplements. Minimum toxic doses from feed supplements tend to produce changes that are limited to the teeth; whereas, there are varied deleterious effects reported from forms derived from forage exposed to factory fumes bearing fluorine compounds.

The authors have made a careful survey of nine herds and have added to the description of symptoms of chronic fluorine intoxication. In addition to those well understood lesions of mottling and staining of teeth, lameness, bony swellings, and other symptoms were observed in those animals examined. Diarrhea, which varied "from occasional and sporadic to a persistent and wide-spread condition", was observed frequently. Deleterious effect on reproduction was recognizable, growth was retarded, and appetite decreased.

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Toxoplasmosis—an Occupational Disease

Tests made with the Sabin-Feldman titer reaction[21] indicate that persons who have contact with dogs often are afflicted with toxoplasmosis. Of six veterinary practitioners tested in Hamburg, five had a positive reaction (two of them with low, not too clear titers); of five veterinary hospital office clerks, three were positive; of three helpers of veterinarians, two; and of two people clipping dogs, one. Of 50 sick dogs, 10% gave the mentioned sero-color test positive. Of 38 people who had contact with 23 dogs affected with toxoplasmosis, 23 had a positive reaction.—*R.S.*

[19]Udall, D. H., and Keller, Keith P., A Report on Fluorosis in Cattle in the Columbia River Valley. *Cornell Vet.*, 42:159 (Apr.), 1952.

[21]Otten, E., and Westphal, A., Die Toxoplasmose-Zur Frage der Berufskrankheit. *Tieraerztl. Umschau*, 6:102 (Mar.) 1951.

Experimental Production of Symptoms of Bovine Hyperkeratosis

Evidence that bovine hyperkeratosis (X disease) is caused by ingestion of toxic substances in the ration has been presented by a number of workers in various parts of the world during the past 18 months. The disease has been produced experimentally by: (1) certain alfalfa pellets; (2) a processed concentrate and fractions of it; (3) a wood preservative; (4) a particular lubricant; and (5) a particular lot of hay.

Bell[22] has shown that symptoms and lesions can be produced in calves by the feeding of highly chlorinated naphthalene contained in certain chassis lubricants which are commonly used on farms and ranches. All petroleum products do not contain this compound and agents other than chlorinated naphthalene contained in some lubricants might possibly be toxic. Until identity of any active factor, or factors, is established, unnecessary exposure of animals to petroleum products should be avoided.

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Edema Disease in Swine

In Belgium, edema disease in swine is on the increase[20]. It is probably due to feed-intoxication and occurs particularly among two-to-four-year-old animals during the summer months and in the fall. Temperatures of affected animals are normal, but there exist ataxia of the hindquarters, edema of the eyelids, incoordination, and paralysis. Often conjunctivitis, dyspnea, and pain-sensation in the skin can be observed. Pathological-histological findings include edema of the eyelids and of the stomach lining, petechiae on the pericardium, and exudates in the thoracic and abdominal cavities, and in the heart sac.

Treatment of the disease consists in the administration of caffeine, calcium gluconate, and antihistamines. Purgation and fasting of the animals are supportive.—*R. S.*

[22]Bell, Wilson B., Further Studies on the Production of Bovine Hyperkeratosis by the Administration of a Lubricant. *Va. Jour. of Sci.*, 3:169 (July), 1952.

[20]Ide, M., Pendelkrankheit bei Schweinen. *Die Veterinärmed.*, 4:172, 1951; from *Vlaams Diergeneesk. Tijdsch.*, 20:100, 1951.

Torsion of the Stomach in the Dog: Two Case Reports

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That torsion of the stomach occurs only in large breeds of dogs has been pointed out by several writers[1,3,4]. Schnelle[5] has observed the condition only in large adult dogs with deep narrow chests; that is, in breeds such as the Irish Setter, Great Dane, Doberman Pinscher, Irish Wolfhound, Russian Wolfhound, Scottish Deerhound and German Shepherd.

Etiology and pathogenesis are not fully understood, but several factors are contributory. Size and conformation of the dog have already been mentioned. A heavily filled stomach with some gas formation is believed by Blackburn and McFarlane[1] and Nieberle and Cohrs[4] to be a prerequisite. An individual weakness in the form of atony or relaxation of the ligaments of the stomach is also presumed to exist[4]. These factors allow the purely mechanical process of torsion to occur. The stomach is then effectively sealed as the esophagus is twisted and the duodenum is compressed between the esophagus dorsally, the liver cranially and the wall of the distended stomach caudally. Gas formation continues and increasing gastric distention brings on the clinical symptoms.

Nieberle and Cohrs[4] recognize a 180° torsion of the esophagus, the stomach turning clockwise on the axis of the esophagus. Blackburn and McFarlane[1] have reported on five autopsy cases, four of which were 270° clockwise torsions and one a 90° counter-clockwise torsion. Experimental work by them has shown that the position of the spleen in relation to the stomach at the moment the dilatation begins is the paramount factor in determining whether the torsion is clockwise or counter-clockwise. The cases presented here were both clockwise torsions of more than 180° but somewhat less than 270°.

Jones[3] has reported the surgical correction of recurring torsion in a German Shepherd. Schnelle[5] observed recurrences in an Irish Setter. The torsion was corrected many times over a long period by passage of a stomach tube. Jones[3] believes that torsions may occur and be corrected by emesis and without treatment. Questioning of the owners in the two cases here reported elicited no previous history of acute gastric distress.

Fig. 1. Case 1. Photograph illustrating torsion at the cardia and dilatation of the stomach.

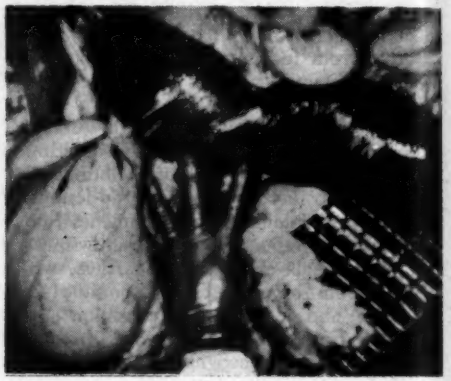

Fig. 2. Case 1. Note severely engorged spleen.

Case 1. The patient, a five-year-old, spayed female Great Dane, was apparently normal three hours before admission to the hospital. Two hours before symptoms became apparent to the owner she had eaten her daily meal and had been exercised for about 45 minutes. The owner noted acute abdominal distention and when the abdomen was palpated signs of pain were manifested by grunting and crying. Distention increased and the dog was brought to the hospital.

Examination revealed marked tympanitic distention of the abdomen, severe pain on palpation, hyperpnea, accelerated heart action

*Intern at the Angell Memorial Animal Hospital, Boston.

and pale mucous membranes. The dog was unwilling to move and preferred to lie down. Demerol (300 mg.) was given intramuscularly and an unsuccessful attempt to pass a stomach tube was made. Resistance was met at the caudal end of the esophagus and slight pressure was of no avail. Temporary relief was obtained by puncturing the stomach through the abdominal wall with an 18-gauge needle and relieving some of the distention. The tympanites returned rapidly and the dog died five hours later; eight hours in all after the first symptoms were noted by the owner, and 10 hours after her last meal.

The autopsy findings were substantially the same as those reported by Blackburn and McFarlane[1]. Figures 1 and 2 illustrate vividly the marked dilatation of the stomach and the engorged spleen.

Case 2. A seven-year-old, male Irish Setter had been present at a children's party approximately 26 hours before and gorged himself on frankfurters, cake, ice cream, soft drinks, etc. He had not eaten since then but apparently had been symptomless until six hours before admission to the hospital. The owner had first noted unsuccessful attempts at vomiting; two hours later marked abdominal distention was noted and the dog refused to move. Clinical examination revealed marked tympanites, hyperpnea, pain, pale mucous membranes and other symptoms attributable to shock. An unsuccessful attempt at passing a stomach tube was made.

A radiograph (fig. 3) was taken and immediate surgery recommended. Pentobarbital sodium was given intravenously to effect and a plastic endotracheal tube inserted with a Y fitting attached to the outer end of the tube. Oxygen was given throughout surgery at the rate of 2 liters per minute. A midline abdominal incision 12 cm. long was made just behind the sternum. The distended stomach immediately filled the entire incision. Gas was slowly removed by puncturing the stomach with a syringe equipped with a two-way valve and 18-gauge needle. Approximately 1,200 cc. of brown-tinged fluid were also removed in this manner. After partial reduction in size of the stomach had been accomplished, the tremendously enlarged spleen, almost black in color, was seen on the left ventral aspect of the stomach, far forward from its normal position. The omentum was ischemic but no hemorrhage nor fluid was found on close examination of the abdominal cavity. The stomach was rotated counter-clockwise into its normal position and then fixed by five interrupted sutures to the left abdominal wall. The incision was closed in three layers with 00 chromic gut. A stomach tube was then passed and the remaining contents aspirated.

After care consisted of subcutaneous administration of 600 cc. isotonic saline and dextrose solution every 12 hours, 300,000 units of procaine penicillin daily and 1 gm. of streptomycin daily in four doses. The stomach contents were removed once daily for two days postoperatively. The dog remained comatose

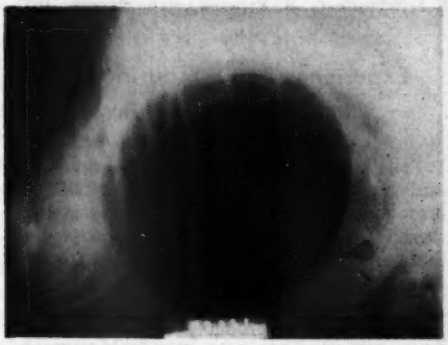

Fig. 3. Case 2. Radiograph of stomach distended with gas.

for three days and the temperature rose to 105 F. on the third day. Intravenous terramycin was given, followed by 250 mg. orally every six hours. On the fourth postoperative day, the dog began to eat, the temperature dropped to normal and fluid therapy was discontinued. The animal continued to improve and was discharged on the eighth postoperative day, apparently normal. According to reports from the owner, the dog has suffered no untoward after-effects and appears to be perfectly well.

Comments

Two cases of torsion of the stomach are reported. Although this condition is infrequently observed, the history and clinical features made diagnosis relatively simple. It seems probable that if there had been prompt recourse to surgery in case 1, recovery would have resulted. The successful outcome of case 2 was due to immediate surgical reduction of the torsion.

In those cases where conservative treatment is of no avail, probably a considerable percentage would respond to prompt surgical reduction of the torsion. Even if conservative treatment is successful, fixing the stomach to the abdominal wall at an early date would be a wise prophylactic measure.

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4. Nieberle, K., and Cohrs, P., Lehrbuch der Speziellen Pathologischen Anatomie der Haustiere, ed. 3, Jena, Gustav Fischer, 1949, p. 244.
5. Schnelle, G. B., Personal communication. 1952.

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Experience with Scouring Pigs

WILLIAM J. O'ROURKE, D.V.M.,
Columbus, Wisconsin

Pellets of bacitracin, implanted subcutaneously at any point of moderate circulation, offer a new approach to the prophylaxis and therapy of baby pig scours. The dosage, by this parenteral route, is not sufficient to exert a bacteriostatic, much less a bactericidal, effect. The results indicate a beneficial effect on growth, which is probably due to uniformly high efficiency of the digestive tract as a result of reduced incidence and severity of intestinal disturbances.

Baby pigs are highly susceptible to scours and dysentery. Damage from such upsets is not limited to the period of observed derangement, but is continued during the period of recovery when the inflamed tissues are returning to normal function.

Experience with Bacitracin

Farm 1. Scours had been troublesome year after year, although the owner was a good manager who fed a well balanced ration in generous quantities.

In the spring of 1951, half of the herd (50 pigs—seven litters) were "pelleted"* when two days of age; the remainder (50 pigs) were left as controls. As in preceding years, the control pigs developed scours intermittently. Many cases were severe and death losses were estimated at five in addition to considerable weight losses of many of the other pigs. The treated pigs, while not free from scours under this exposure, were less frequently and less severely affected.

At 5½ months of age, the treated group were marketed at an average weight of 236 lb., with two of the top pigs weighing 255 lb. At that time, the remaining control pigs averaged 215 lb.

The owner was enthusiastic about the treatment and so anxious to implant all pigs in the next farrowing that the writer was unable to convince him that controls should be left. Hence there are no reports on any difference in this group.

Farm 2. Scours had been prevalent in previous lots of pigs and had caused losses in 1950. This farm was only a mile from farm 1, so the story of pellet implanting reached the owner at about the time an outbreak of scours got started.

Although the pigs then averaged about 30 lb. each, they varied in age and weight. It was pointed out that this was not the recommended time for pellet implantation, but the neighbor had been a good salesman. Pigs were treated and, in contrast to the experience of the previous year, the writer's standard treatment of injection of hog cholera antiserum in moderate doses and oral medication to control the scours, produced results that were satisfactory. The pigs straightened up promptly and were set back little, if any.

These reports in two herds are typical of what the writer has come to expect. The treatment has been used in herds where scours are well established and where losses had begun. There is no recognizable improvement when used in pigs that are dehydrated and weakened. On those which had resisted infection during the early stages of the outbreak, some owners thought recovery was more rapid. It is believed, however, that this is wishful thinking.

Bacitracin pellets implanted at farrowing time or during the first few days of life help baby pigs to avoid some of the scours and the common sequelae of digestive disturbances. Pellets are in no sense a panacea or cure-all for all the diseases to which baby pigs are subject. They will not replace good sanitation and hog management, but they do permit a somewhat more favorable prognosis in some of the problem herds where digestive troubles have appeared in the face of the usual farm management procedures.

*Pellets containing 1,000 units bacitracin were furnished by Commercial Solvents Corporation through Dr. R. C. Klussendorf, Director of Veterinary Medical Services, Terre Haute, Ind.

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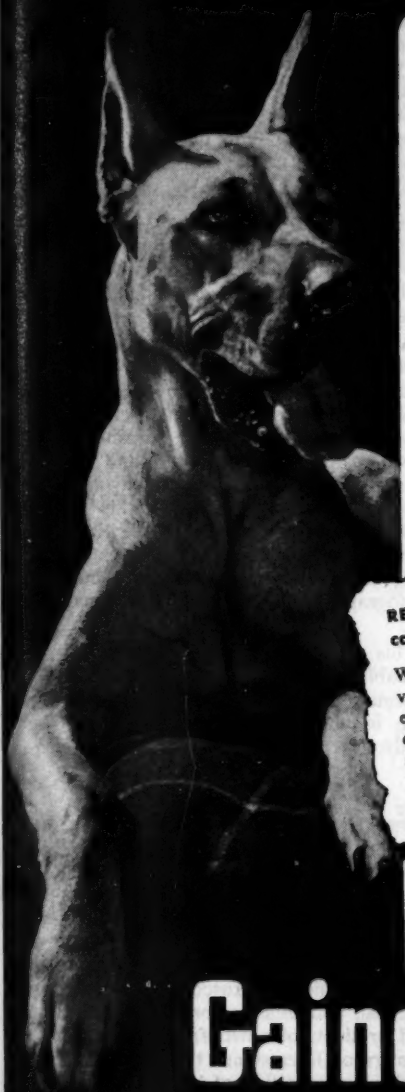
The A.B.R. (abortus Bang ringprobe) test is so sensitive in determining the presence of brucellosis in a herd that when the milk of from five to ten cattle is mixed there will be a positive reaction even if only one of the cows carries Brucella agglutinins. It is on this basis that mixed-herd milk delivered in cans to a creamery may determine the existence of a single infected animal in the herd.

SCIENCE GIVES NEW MEANING TO THE PHRASE:

"A DOG'S LIFE"



● Time was when the phrase, "a dog's life," meant something mighty unpleasant! Now, thanks to modern Veterinary Medicine and scientifically advanced methods of care and feeding—a dog's life can be not only a happier and healthier one—but a longer life, as well.

In helping to prevent those conditions that bring about disease and "early old age" in dogs, the fields of Veterinary Medicine and dog nutrition were never more importantly teamed. Both are aware of the vital role nutrition plays in helping to promote and sustain vigorous health over the years.

Recent advertisements on New Homogenized* Gaines Meal sum up these facts. They feature the health-protecting qualities of this completely balanced, uniformly nourishing dog food. And they advise millions of dog owners as follows:

REMEMBER—YOUR VETERINARIAN, TOO, can help you prolong your dog's active years!

When you give your dog the kind of nourishment provided by Gaines, you definitely increase his chances of enjoying a longer **Prime of Life.** But proper care of your dog is essential, too. No food can protect your dog against all ailments and diseases. Just as you'd take a child to your doctor for a regular checkup, take your dog to your veterinarian for a regular checkup, too.

**Uniform Nourishment Guaranteed. Each and every granule contains uniform amounts of every food essential dogs are known to need. Developed by the Gaines Laboratories and tested at the famous Gaines Research Kennels.*

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Gaines *America's Largest-Selling Dog Food*

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BOOK REVIEWS

Books reviewed in this department and any other books, if available, may be obtained by remitting the published price to the Book Department, Veterinary Medicine, Suite 803 Livestock Exchange Building, Kansas City 15, Missouri.

INSECTS — THE YEARBOOK OF AGRICULTURE, edited by *Alfred Stefferud,* United States Government Printing Office. 780 pages, cloth bound. For sale by the Superintendent of Documents, Washington 25, D. C. — Price $2.50.

The latest in the series of annual publications of the USDA is the new Yearbook designed as a practical aid in identifying insects. It is produced as a Congressional document. Its main distribution is by members of the Senate and House of Representatives.

Insects, including livestock parasites, take on significance when it is recorded that they cause $4,000,000,000. damage each year in the United States. Secretary of Agriculture, Charles F. Brannan, points out in the foreword that, "Although the science of entomology has made great progress in the past two decades, the problems caused by insects seem to be bigger than ever. We have more insect pests, although we have better insecticides to use against them and better ways to fight them."

This book is written for the layman, the farmer, city people, or any others interested. Only in one chapter of 16 pages, Livestock and Insects, is specific information given regarding insects having veterinary significance. Nevertheless, the importance of the entire subject vital to all is emphasized. Besides the section already mentioned, veterinarians will find good reading and references in the sections on Insects as Destroyers, The Nature of Insecticides, Warnings as to Insecticides, and Economic Entomology.

Many illustrations and drawings show details helpful in identification. Appended are 72 color plates of common pests. Opposite each is descriptive material and brief information on control.

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Bulletins and Circulars

MICROSCOPIC DIAGNOSIS OF PARASITISM IN DOMESTIC ANIMALS. Prepared by Department of Veterinary Research, Agricultural Experiment Station, University of Illinois, Urbana, in cooperation with the College of Veterinary Medicine. Circular 698.—Price $1.50.

This is more than expected of an experiment station circular. It is a paper-bound book of 135 pages. Paper stock is high grade for best reproduction of many fine photographs and well prepared charts contained within the covers.

Aside from a brief introductory section to matters pertaining to parasites, collection of specimens, and technics for examination, the bulk of the book is given over to graphic presentation of the common parasites of swine, horses, cattle, sheep, poultry, and small animals; treating each parasite on a two-page spread so that when the book is opened a chart portraying the life cycle is opposite photographs illustrating the parasite. Among these are life-size reproductions and microphotographs of smaller parasites, parts, and ova.

This circular replaces an earlier one. It is available in limited numbers to students and veterinarians and will serve a most useful purpose in the diagnosis laboratory. Keep it handy next to your microscope.

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DIE UNTERSUCHUNG VON TIEREN STAMMENDER LEBENSMITTEL, by Prof. Dr. F. Schoenberg. Sixth Edition. 314 pages, 117 illustrations. M & H. Schaper, Hannover-Waldhausen, Germany, publisher, 1950. Written for veterinarians in private practice or public work, this book compiles dependable, simple methods —macroscopic, microscopic, bacteriological, chemical, and others—for the investigation of food products obtained from animals. Among chapters of interest are those concerned with botulism; recognition of horse meat; investigation of canned meats, sausages, deer meat, frozen meat, fish, and eggs. Many interesting cases reports and court decisions are included in the text. • • •